AD-A163 522 FOUNDATION ANALYSIS EAST COAST AIR COMBAT MANEUVERING RANGE OFFSHORE KITT..(U) CREST ENGINEERING INC TULSA OK SEP 76 27-771-97 CHES/NAVFAC-FPO-7612 N62477-76-C-0179 1/6

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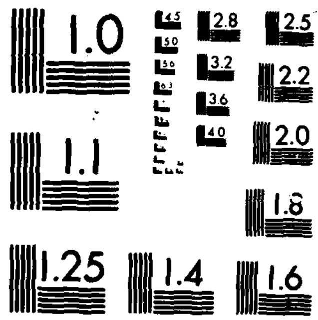

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NATIONAL BUREAU OF STANDARDS 1963 A

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FOUNDATION ANALYSIS
EAST COAST AIR COMBAT MANEUVERING RANGE
OFFSHORE KITTY HAWK, NORTH CAROLINA

CONTRACT NO. N62477-76-C-0179
MODIFICATION NO. P0001

Report No. 27-771-97

Prepared for

NAVAL FACILITIES ENGINEERING COMMAND
DEPARTMENT OF THE NAVY
CHESAPEAKE DIVISION

By

CREST ENGINEERING, INC.
TULSA, OKLAHOMA

September 1976

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Kitty Hawk, NC

19. ABSTRACT (Continue on reverse if necessary & identify by block number)
The objective of this report is to establish the design criteria for 42" diameter piling foundations to support four tripod-type ocean structures for U.S. Navy Air Combat Maneuvering Range (ACMR) Offshore Kitty Hawk, NC
The four tripod-type structures are designed, respectively, for the (Con't)

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Jacqueline B. Riley

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BLOCK 19 (Con't)

water depths (MLW) of 81 feet (one structure), 93 feet (one structure) and 105 feet (two structures). The structures are to be anchored to the seabed by driving 42" diameter piling through each leg of the templets and penetrating approximately 250 feet into the subsea soils. Vulcan 560 hammer or equivalent will be employed to drive the piling into the desired penetration.

SECTION 1

INTRODUCTION

1.1 INTRODUCTION

The objective of this report is to establish the design criteria for 42" diameter piling foundations to support four tripod-type ocean structures for the U.S. Navy Air Combat Maneuvering Range (ACMR) Offshore Kitty Hawk, North Carolina, U.S.A.

The four tripod-type structures are designed, respectively, for the water depths (MLW) of 81 feet (one structure), 93 feet (one structure) and 105 feet (two structures). The structures are to be anchored to the seabed by driving 42" diameter piling through each leg of the templets and penetrating approximately 250 feet into the subsea soils. Vulcan 560 hammer or equivalent will be employed to drive the piling into the desired penetration.

1.2 METHODS OF ANALYSIS

The method employed to perform the computation of pipe pile capacity curves, as presented in Section 2, is empirical in nature. McClelland soil report (Volume No. 1, Foundation Investigation, Report to Cubic Corporation) serves as the basis of engineering data to develop the capacity curves for each boring site.

Stress-wave equation analysis is used in Section 3 to produce pile driving resistance curves. It should be noted that these curves provide only a possible range of pile drivability for the engineer to have a better judgment in the design of piling foundations and in no way assume attainment of the desired penetration.

1.3 PERSONNEL RESUMES

The personnel whose resumes follow were actively engaged on this project.

CREST OFFSHORE, INC.

Chingmiin (Charlie) Chern

Senior Engineer

University	Degree	Year
National Taiwan University	Bachelor of Science Civil Engineering	1961
North Dakota State University	Master of Science Civil Engineering	1966
Lehigh University	Ph. D. Civil Engineering	1969
Tulsa University	Graduate Study in Business Administration-Management	1974

Societies, Licenses, and Other Activities:

Member American Society of Civil Engineers
Member International Association of Structural and Bridge Engineers
Member American Society of Engineering Education
Registered Professional Engineer in Oklahoma

Experience:

1973 to Present — Crest Offshore, Inc.

Senior Civil Engineer

Engaged in the feasibility studies, structural analysis and design of offshore structures, equipment supports and other various types of petroleum related civil engineering works. Assignments include:

... Evaluation of engineering designs from other agencies.
... Analysis and design of offshore structures for oil industry.
... Analysis and design of supports and foundations for onshore refinery facilities.
... Development of a sequence of computer programs for the analysis of offshore structures.

CREST OFFSHORE, INC.

Chingmiin (Charlie) Chern

Senior Civil Engineer

Experience Continued:

1969 to 1973	North Dakota State University	
Associate Professor of Civil Engineering	Engaged in full-time lecture instruction for civil engineering (graduate school division) and construction management. Also served as consultant to local industry (undergraduate school division) in the area of computer applications in engineering.	
1966 to 1969	Fritz Engineering Laboratory	
Research Assistant	Assisted in the design and testing of various types of steel structures.	
1966	North Dakota State Highway Department	
Highway Engineer	Responsible for construction surveying.	
1965	U.S. Forest Service	
Assistant Crew Chief	Assisted in surveying responsibilities.	

SECTION 2

PIPE PILE CAPACITY CURVES

2.1 INTRODUCTION

Axial capacity curves are developed hereinafter for 42" diameter piling at boring site Nos. 2, 3A and 4, respectively. Axial capacity curves for boring site No. 1 were developed in previous report (Report No. 27-771-92, Appendix C, THREE-PILE CONCEPT CALCULATIONS) and are presented herein.

The method utilized for capacity curve development is an empirical procedure, as presented in the McClelland soils report, for pipe piles penetrating through alternating strata of sand and clay. The capacity curves for 30" diameter piling as given in the McClelland soils report are also included to illustrate the compatibility of those developed in this section.

2.2 CAPACITY CURVES FOR BORING SITE NO. 1

CREST OFFSHORE, INC.

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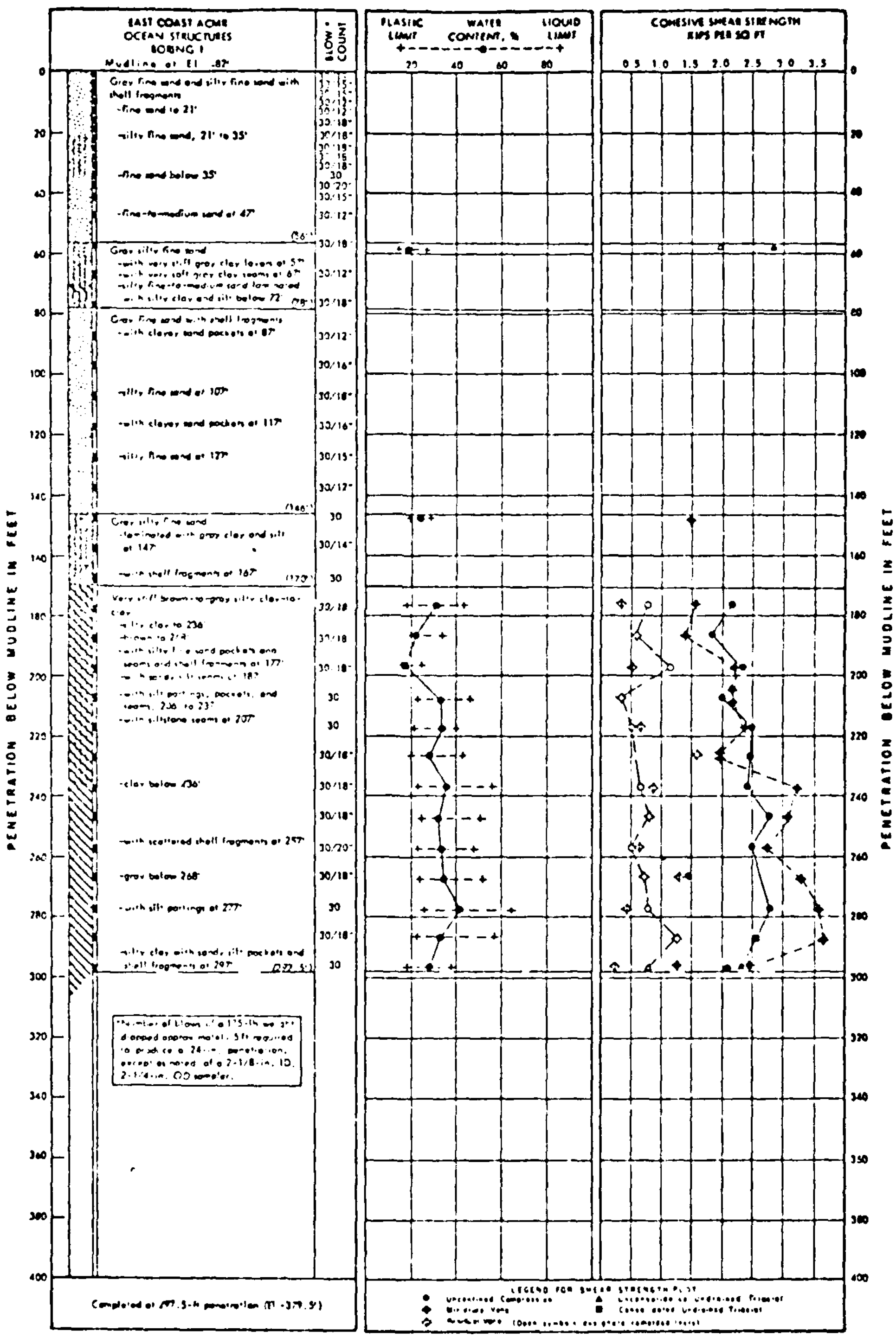
By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)

Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1



LOG OF BORING AND TEST RESULTS

CREST OFFSHORE, INC.

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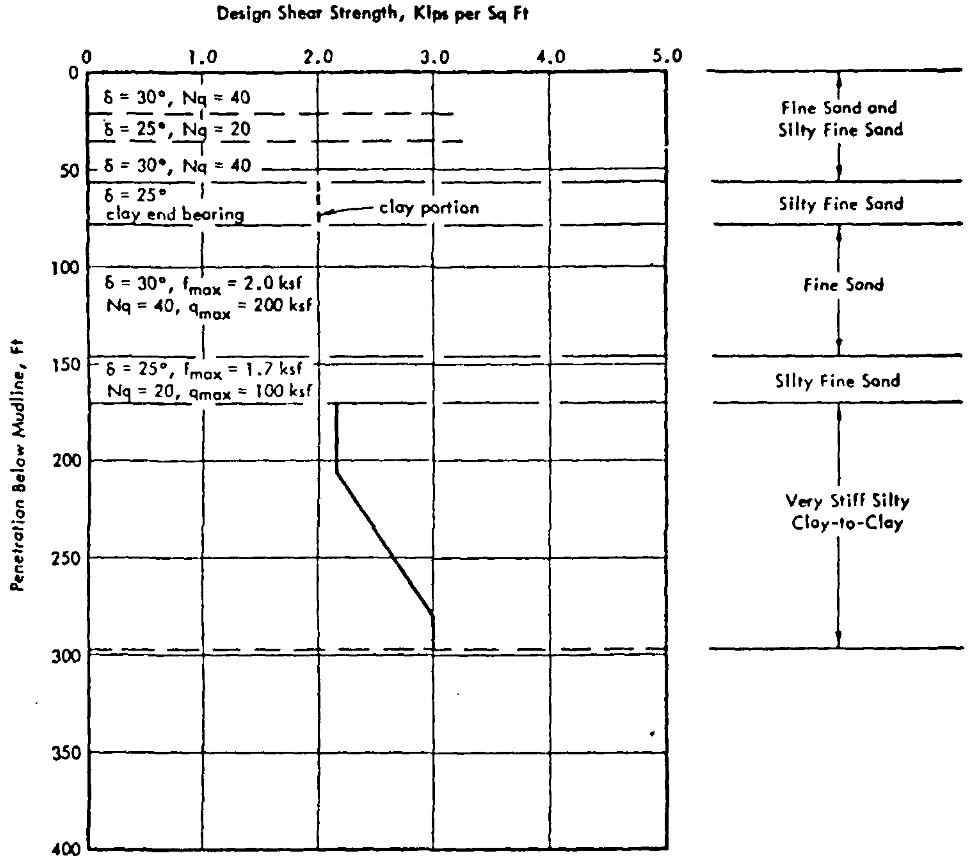
By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1



STRENGTH PARAMETERS

CREST OFFSHORE, INC.

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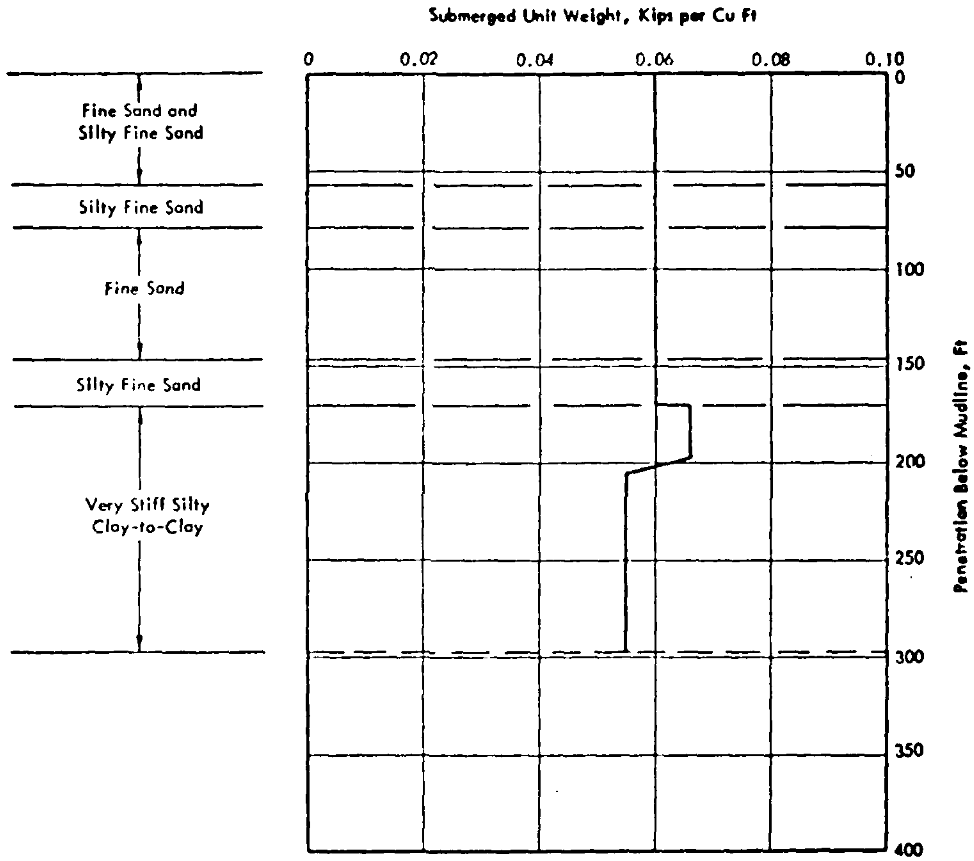
By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1



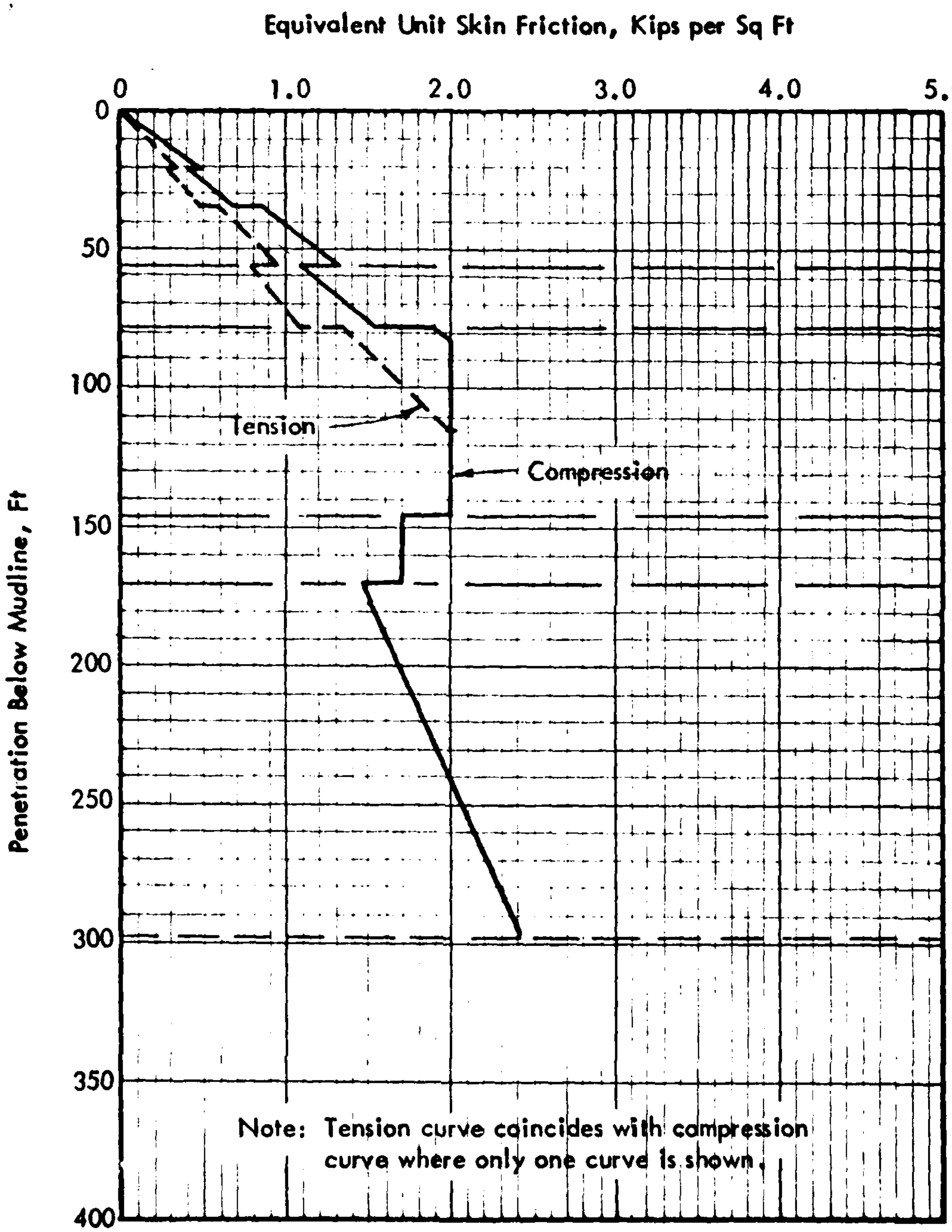
SUBMERGED UNIT WEIGHT

CREST OFFSHORE, INC.

Sheet 2.06 of 78

By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1



EQUIVALENT UNIT SKIN FRICTION

CREST OFFSHORE, INC.

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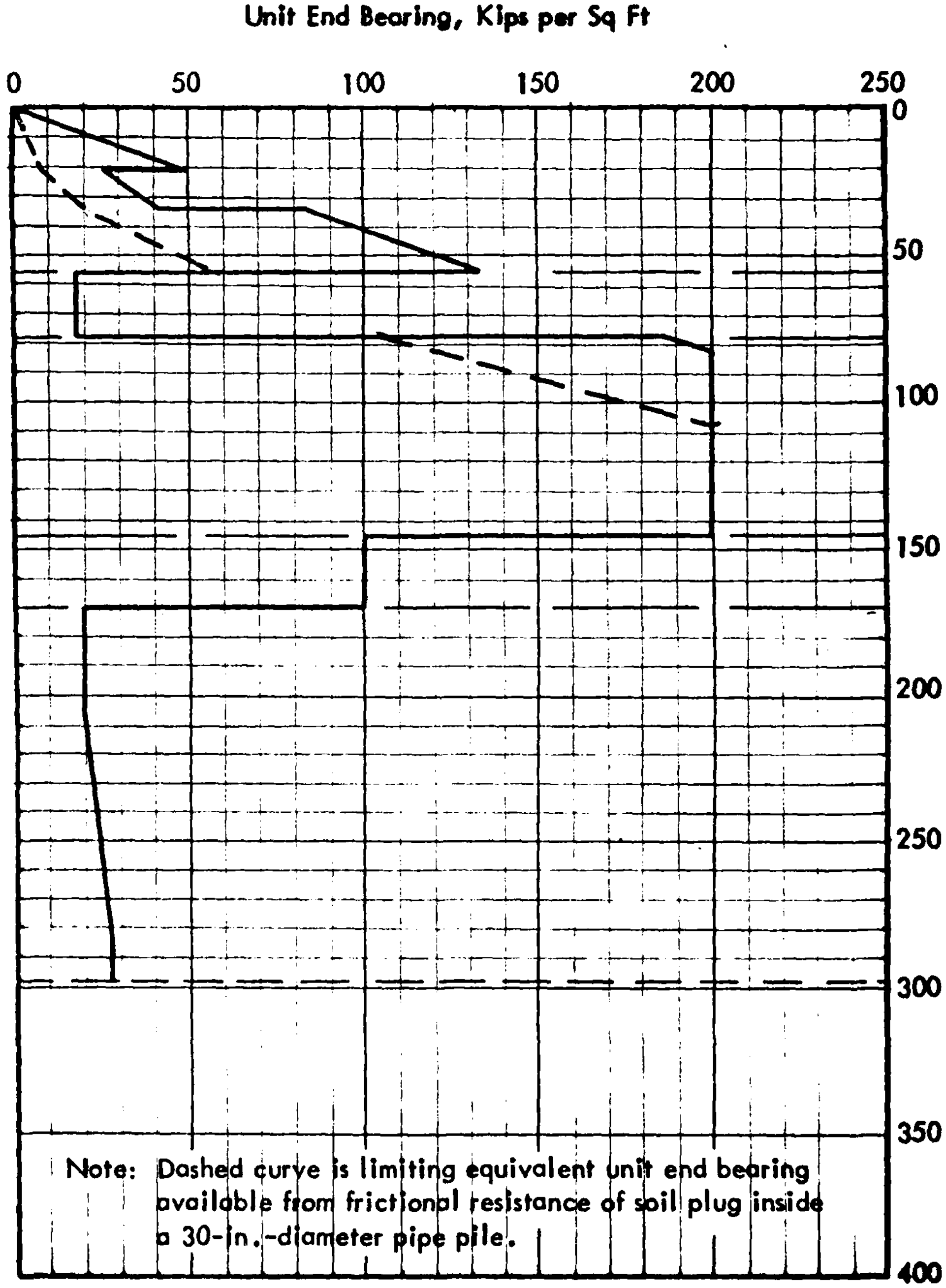
By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1



UNIT END BEARING

CREST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 20	0 0.45	0 9	20
20 35	0.40 0.67	9 20	15
35 56	0.85 1.30	20 55	21
56 79	1.10 1.65	18 18	23
79 82	1.90 2.00	105 115	3
82 107	2.00 2.00	115 200	25
107 115	2.00 2.00	200 200	8
115 145	2.00 2.00	200 200	30
145 170	1.70 1.70	100 100	25
170 205	1.48 1.72	20 20	35
205 280	1.72 2.30	20 28	75
280 300	2.30 2.40	28 28	20

$\Sigma = 300$ ft

UNIT CAPACITY IN COMPRESSION

CREST OFFSHORE, INC.

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By C. Cheru Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 20	0 0.33	–	20
20 35	0.29 0.46	–	15
35 56	0.60 0.95	–	21
56 79	0.80 1.10	–	23
79 82	1.35 1.43	–	3
82 107	1.43 2.00	–	25
107 115	2.00 2.00	–	8
115 145	2.00 2.00	–	30
145 170	1.70 1.70	–	25
170 205	1.48 1.72	–	35
205 280	1.72 2.30	–	75
280 300	2.30 2.40	–	20

Σ 300 ft

UNIT CAPACITY IN TENSION

CREST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

Skin Friction Capacity ($Q_s = f_{as} A_s$)

--- Compression ---

BORING #1

O.D. = 42"

$A_s = \pi D (\Delta l) = 10.996 (\Delta l)$ SQ.FT

Penetration Below Mudline (ft)	Unit Skin Friction (ksf)	Ave. Unit Skin Friction f_{as} (ksf)	Segment Length (Δl) (FT)	Skin Friction in Segment (kips)	Total Skin Friction (kips)
0 20	0 0.45	0.225	20	49.5	0 49.5
20 35	0.40 0.67	0.535	15	88.2	137.7
35 56	0.85 1.30	1.075	21	248.2	385.9
56 79	1.10 1.65	1.375	23	347.7	733.6
79 82	1.90 2.00	1.950	3	64.3	797.9
82 107	2.00 2.00	2.00	25	549.8	1,347.7
107 115	2.00 2.00	2.00	8	175.9	1,523.6
115 145	2.00 2.00	2.00	30	659.8	2,183.4
145 170	1.70 1.70	1.70	25	467.3	2,650.7
170 205	1.48 1.72	1.60	35	615.8	3,266.5
205 280	1.72 2.30	2.01	75	1,657.6	4,924.1
280 300	2.30 2.40	2.35	20	516.8	5,440.9
			$\Sigma = 300$ ft		

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 22-771-92 Calculation Pipe Pile Capacity Curves

BORING # 1

End Bearing Capacity ($Q_p = q A_p$)

Penetration Below Mudline (ft)	Unit End Bearing q (ksf)	30"φ A_p 4.91 SQ.FT	36"φ A_p 7.07 SQ.FT	39"φ A_p 8.30 SQ.FT	42"φ A_p 9.62 SQ.FT
0	0	0	0	0	0
20	9	44.2	63.6	74.7	86.6
20	9				
35	20	98.2	141.4	166.0	192.4
35	20				
56	35	171.9	247.5	290.5	336.7
56	18	88.4	127.3	149.4	173.2
79	18				
79	105	515.6	742.4	871.5	1,010.1
82	115	564.7	813.1	954.5	1,106.3
82	115				
107	200	982.0	1,414.0	1,660.0	1,924.0
107	200				
115	200				
115	200				
145	200				
145	100	491.0	707.0	830.0	962.0
170	100				
170	20	98.2	141.4	166.0	192.4
205	20				
205	20				
280	28	137.5	198.0	232.4	269.4
280	28				
300	28				

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 22-771-92 Calculation Pipe Pile Capacity Curves -
Boring #1

Ultimate Pile Capacity ($Q = Q_s + Q_p$) --- Compression

Penetration Below Mudline (ft)	30"ϕ Q (kips)	36"ϕ Q (kips)	39"ϕ Q (kips)	42"ϕ Q (kips)
0 20	0 79.5	0 106.0	0 120.6	0 136.1
20 35	196.7	259.4	293.8	330.1
35 56	447.7	578.3	648.8	722.6
56 79	364.2 612.6	458.1 756.2	507.7 830.6	559.1 906.8
79 82	1,039.7 1,134.8	1,371.3 1,497.1	1,552.7 1,695.4	1,743.7 1,904.2
82 107	1,944.8	2,569.3	2,911.4	3,271.7
107 115	2,070.5	2,720.1	3,074.8	3,447.6
115 145	2,541.7	3,285.6	3,687.4	4,107.4
145 170	2,050.7 2,384.5	2,578.6 2,979.2	2,857.4 3,291.3	3,145.4 3,612.7
170 205	1,991.7 2,431.5	2,413.6 2,941.4	2,627.3 3,199.1	2,842.7 3,458.5
205 280	3,654.8	4418.8	4,804.7	5,193.5
280 300	4,023.9	4,861.8	5,284.4	5,710.3

CREST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 4-1-76 Job No. 27-721-92 Calculation Pipe Pile Capacity Curves

BORING #1

Design Pile Capacity ($Q_d = Q/F.S.$) --- Compression

$F.S. = 1.5$

Penetration Below Mudline (ft)	30"Φ Q_d (kips)	36"Φ Q_d (kips)	39"Φ Q_d (kips)	42"Φ Q_d (kips)
0 20	0 53.0	0 70.7	0 80.4	0 90.7
20 35	131.1	172.9	195.9	220.1
35 56	298.5	385.5	432.5	481.7
56 79	242.8 408.4	305.4 504.1	338.5 553.7	372.7 604.5
79 82	693.1 756.5	914.2 998.1	1,035.1 1,130.3	1,162.5 1,269.5
82 107	1,296.5	1,712.9	1,940.9	2,181.1
107 115	1,380.3	1,813.4	2,049.9	2,298.4
115 145	1,694.5	2,190.4	2,458.3	2,738.3
145 170	1,367.1 1,589.7	1,719.1 1,986.1	1,904.9 2,194.2	2,096.9 2,408.5
170 205	1,327.8 1,621.0	1,609.1 1,960.9	1,751.5 2,132.7	1,895.1 2,305.7
205 280	2,436.5	2,945.9	3,203.1	3,462.3
280 300	2,682.6	3,241.2	3,522.9	3,806.9

By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 3-31-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

Skin Friction Capacity ($Q_s = f_{as} A_s$)

--- Tension --- O.D. = 42"

Boring #1 $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

Penetration Below Mudline (ft)	Unit Skin Friction (ksf)	Ave. Unit Skin Friction f_{as} (ksf)	Segment Length (Δl) (FT)	Skin Friction in Segment (kips)	Total Skin Friction (kips)
0 20	0 0.33	0.165	20	36.3	0 36.3
20 35	0.29 0.46	0.375	15	61.9	98.2
35 56	0.60 0.95	0.775	21	179.0	277.2
56 79	0.80 1.10	0.950	23	240.3	517.5
79 82	1.35 1.43	1.390	3	45.9	563.4
82 107	1.43 2.00	1.715	25	471.5	1,034.9
107 115	2.00 2.00	2.00	8	175.9	1,210.8
115 145	2.00 2.00	2.00	30	659.8	1,870.6
145 170	1.70 1.70	1.70	25	467.3	2,337.9
170 205	1.48 1.72	1.60	35	615.8	2,953.7
205 280	1.72 2.30	2.01	75	1,657.6	4,611.3
280 300	2.30 2.40	2.35	20	516.8	5,128.1
			$\Sigma = 300$ ft		

CREST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 4-1-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1

Ultimate Pile Capacity (Q = Qs) --- Tension

Penetration Below Mudline (Ft)	30"Φ Q (kips)	36"Φ Q (kips)	39"Φ Q (kips)	42"Φ Q (kips)
0	0	0	0	0
20	25.9	31.1	33.7	36.3
20				
35	70.1	84.1	91.1	98.2
35				
56	197.9	237.5	257.3	277.2
56				
79	369.5	443.4	480.4	517.5
79				
82	402.3	482.7	523.0	563.4
82				
107	739.0	886.8	960.8	1,034.9
107				
115	864.7	1,037.6	1,124.2	1,210.8
115				
145	1,335.9	1,603.1	1,736.8	1,870.6
145				
170	1,669.7	2,003.7	2,170.7	2,337.9
170				
205	2,109.5	2,531.5	2,742.5	2,953.7
205				
280	3,293.5	3,952.3	4,281.7	4,611.3
280				
300	3,662.6	4,395.3	4,761.6	5,128.1

CREST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 4-1-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves

BORING #1

Design Pile Capacity ($Q_d = Q/F.S.$) --- Tension

$F.S. = 1.5$

Penetration Below Mudline (Ft)	30"Φ Q_d (kips)	36"Φ Q_d (kips)	39"Φ Q_d (kips)	42"Φ Q_d (kips)
0 / 20	0 / 17.3	0 / 20.7	0 / 22.5	0 / 24.2
20 / 35	46.7	56.1	60.7	65.5
35 / 56	131.9	158.3	171.5	184.8
56 / 79	246.3	295.6	320.3	345.0
79 / 82	268.2	321.8	348.7	375.6
82 / 107	492.7	591.2	640.5	689.9
107 / 115	576.5	691.7	749.5	807.2
115 / 145	890.6	1,068.7	1,157.9	1,247.1
145 / 170	1,113.1	1,335.8	1,447.1	1,558.6
170 / 205	1,406.3	1,687.7	1,828.3	1,969.1
205 / 280	2,195.7	2,634.9	2,854.5	3,074.2
280 / 300	2,441.7	2,930.2	3,174.4	3,418.7

CREST OFFSHORE, INC.

By C. Chern Client U. S. NAVY Subject Structural Concept Analysis (3-pile)
Date 4-1-76 Job No. 22-721-92 Calculation Pipe Pile Capacity Curves
BORING #1

42-in. Diameter Pipe Piles

(i) At Penetration 45.5ft (=56'-10.5')

End Bearing $Q_p = 46 \times 9.62 = 442.5$ kips

Skin Friction $Q_s = 137.7 + 1.075(21 - 10.5) \times 10.996$
(see pg. 2.17)

$= 137.7 + 124.1$

$= 261.8$ kips

Ultimate Capacity $Q = 261.8 + 442.5 = 704.3$ kips

Design Capacity $Q_d = 469.5$ kips

(ii) At Penetration 134.5 ft (=145'-10.5')

End Bearing $Q_p = 200 \times 9.62 = 1{,}924$ kips

Skin Friction $Q_s = 1{,}523.6 + 2.0 \times (30 - 10.5) \times 10.996$
(See Pg. 2.17)

$= 1{,}523.6 + 428.8$

$= 1{,}952.4$ kips

Ultimate Capacity $Q = 1{,}952.4 + 1{,}924 = 3{,}876.4$ kips

Design Capacity $Q_d = 2{,}584.3$ kips

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)
Date 4-1-76 Job No. 22-771-92 Calculation Pipe Pile Capacity Curves
BORING #1

(iii) At Penetration 159.5 ft (=170' - 10.5')

End Bearing $Q_p = 100 \times 9.62 = 962$ kips

Skin Friction $Q_s = 2,183.4 + 1.70 \times (25-10.5) \times 10.996$
(See p. 2.17)

$= 2,183.4 + 271.1$

$= 2,454.5$ kips

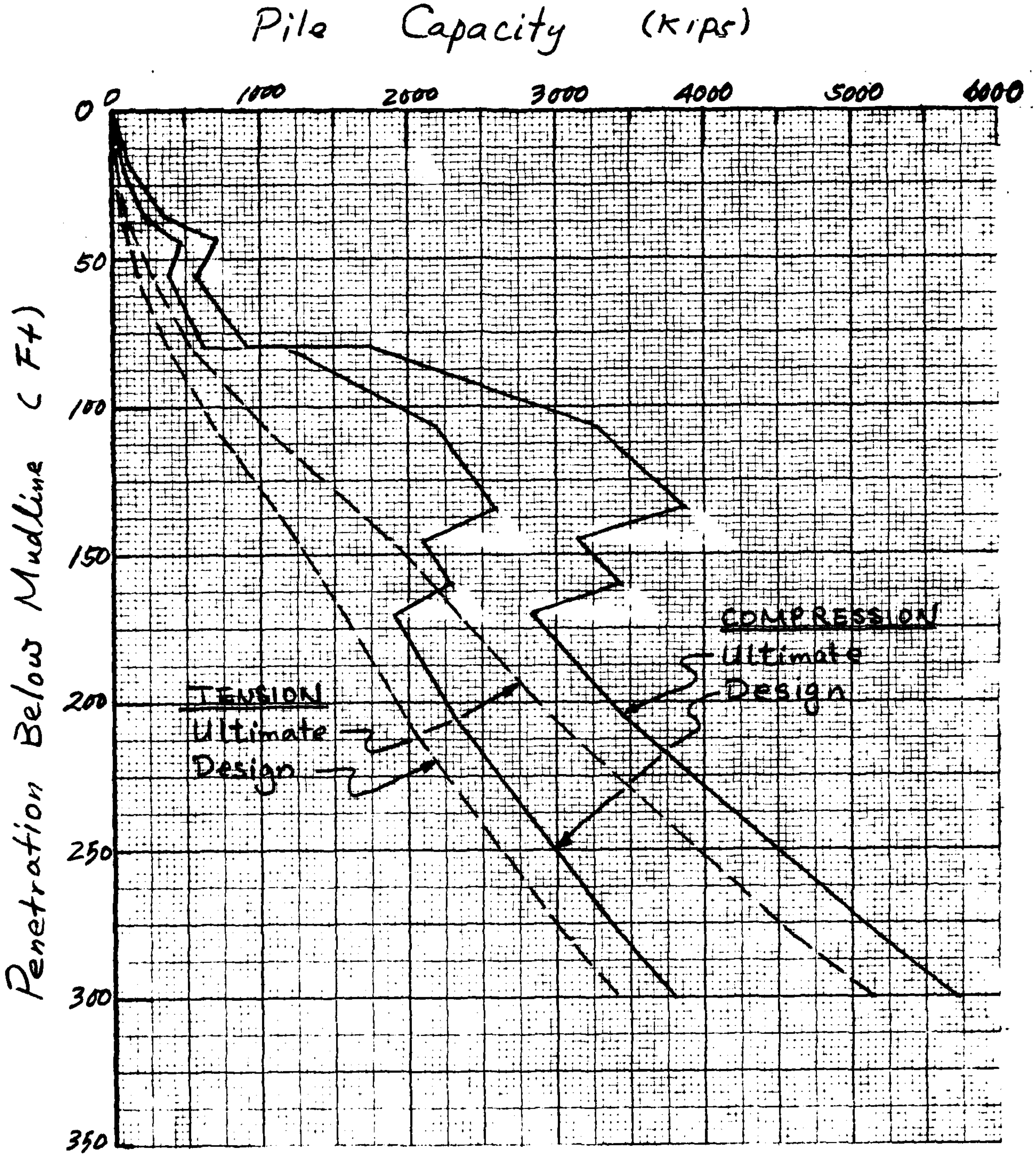
Ultimate Capacity $Q = 2,454.5 + 962 = 3,416.5$ kips

Design Capacity $Q_d = 2,277.7$ kips

CREST OFFSHORE, INC. Sheet 2.19 of 78

By C. Chern Client U.S. NAVY Subject Structural Concept Analysis (3-pile)

Date 4-1-76 Job No. 27-771-92 Calculation Pipe Pile Capacity Curves



42-in. Diameter Pipe Piles

(Boring #1)

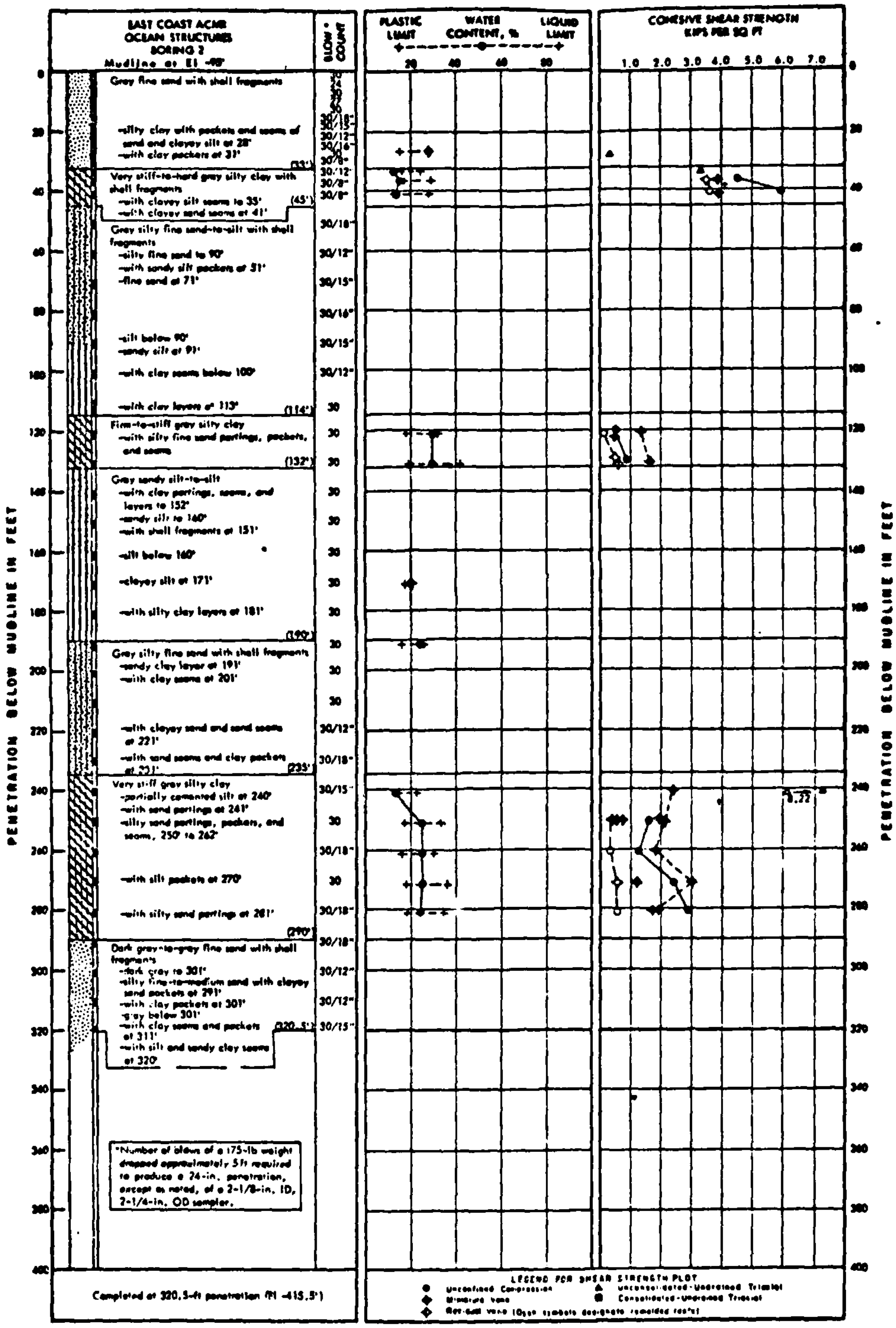
2.3 CAPACITY CURVES FOR BORING SITE NO. 2

CREST OFFSHORE, INC.

Sheet 2.21 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

BORING #2



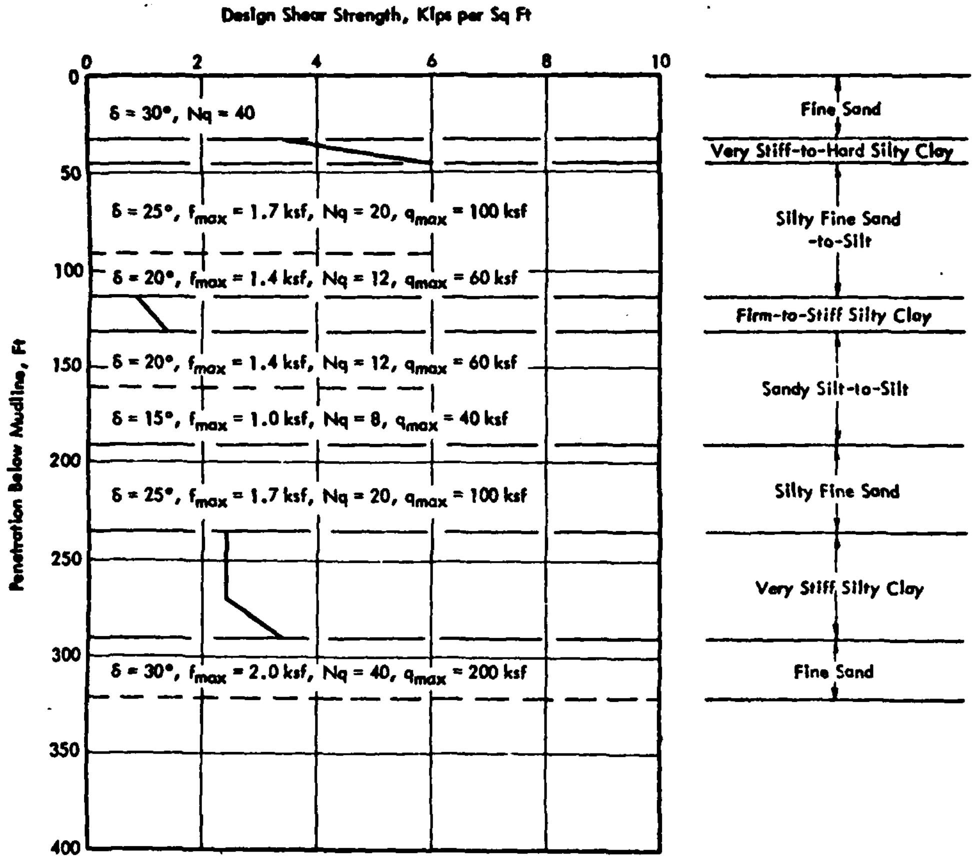
LOG OF BORING AND TEST RESULTS

CREST OFFSHORE, INC.

Sheet 2.22 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 22-771-91 Calculation Pipe Pile Capacity Curves

Boring #2



STRENGTH PARAMETERS

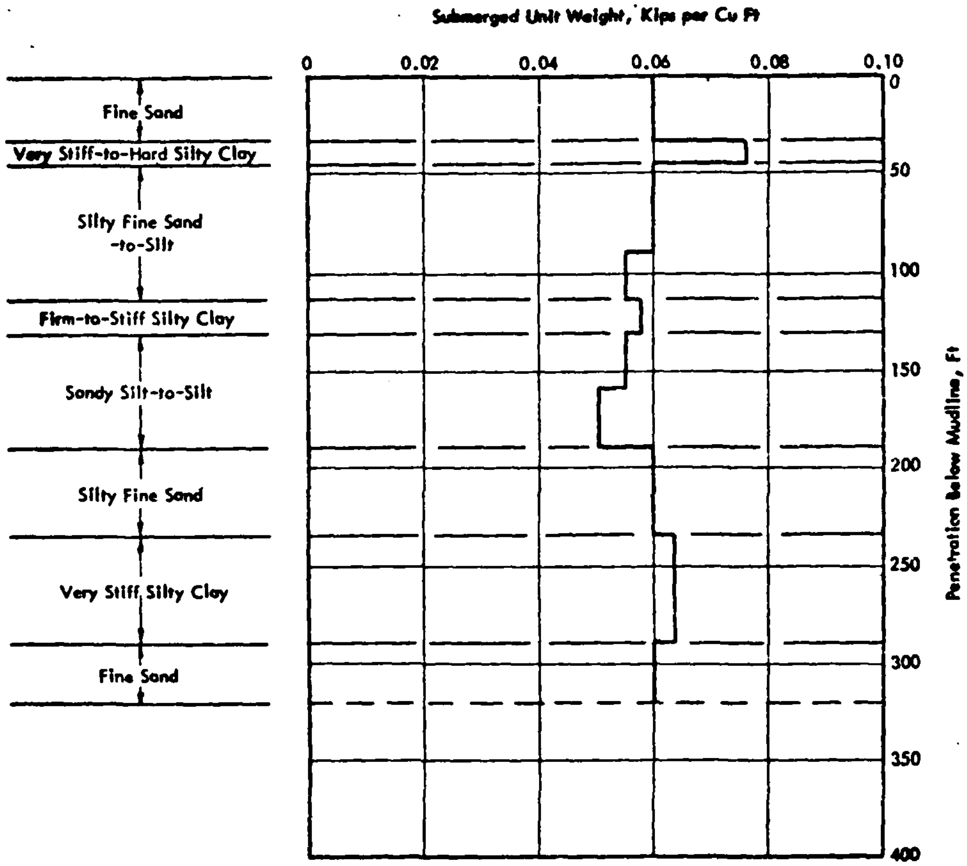
CREST OFFSHORE, INC.

Sheet 2.23 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-3-76 Job No. 22-721-97 Calculation Pipe Pile Capacity Curves

Boring #2

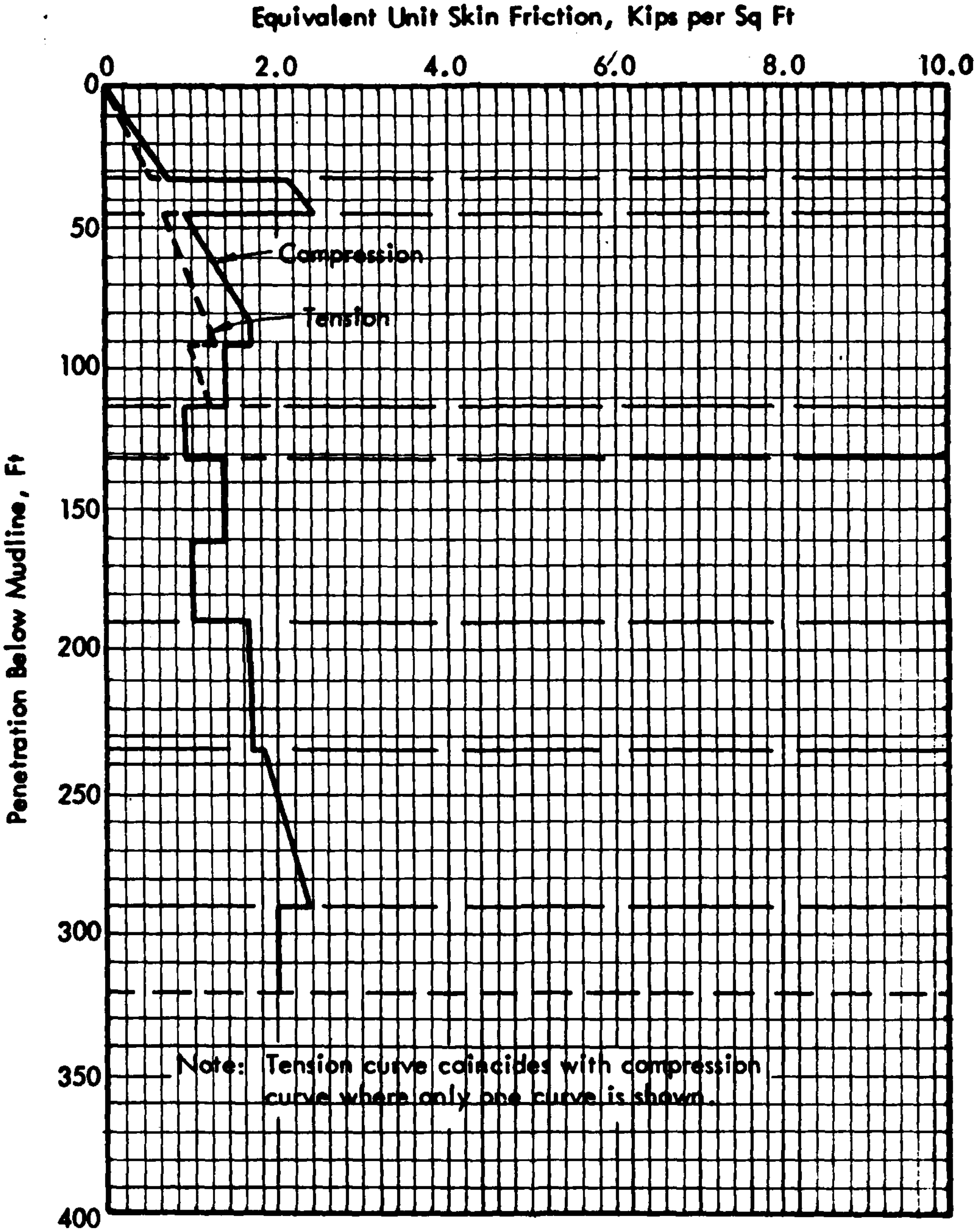


SUBMERGED UNIT WEIGHT

CREST OFFSHORE, INC.

Sheet 2.24 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-77L-97 Calculation Pipe Pile Capacity Curves



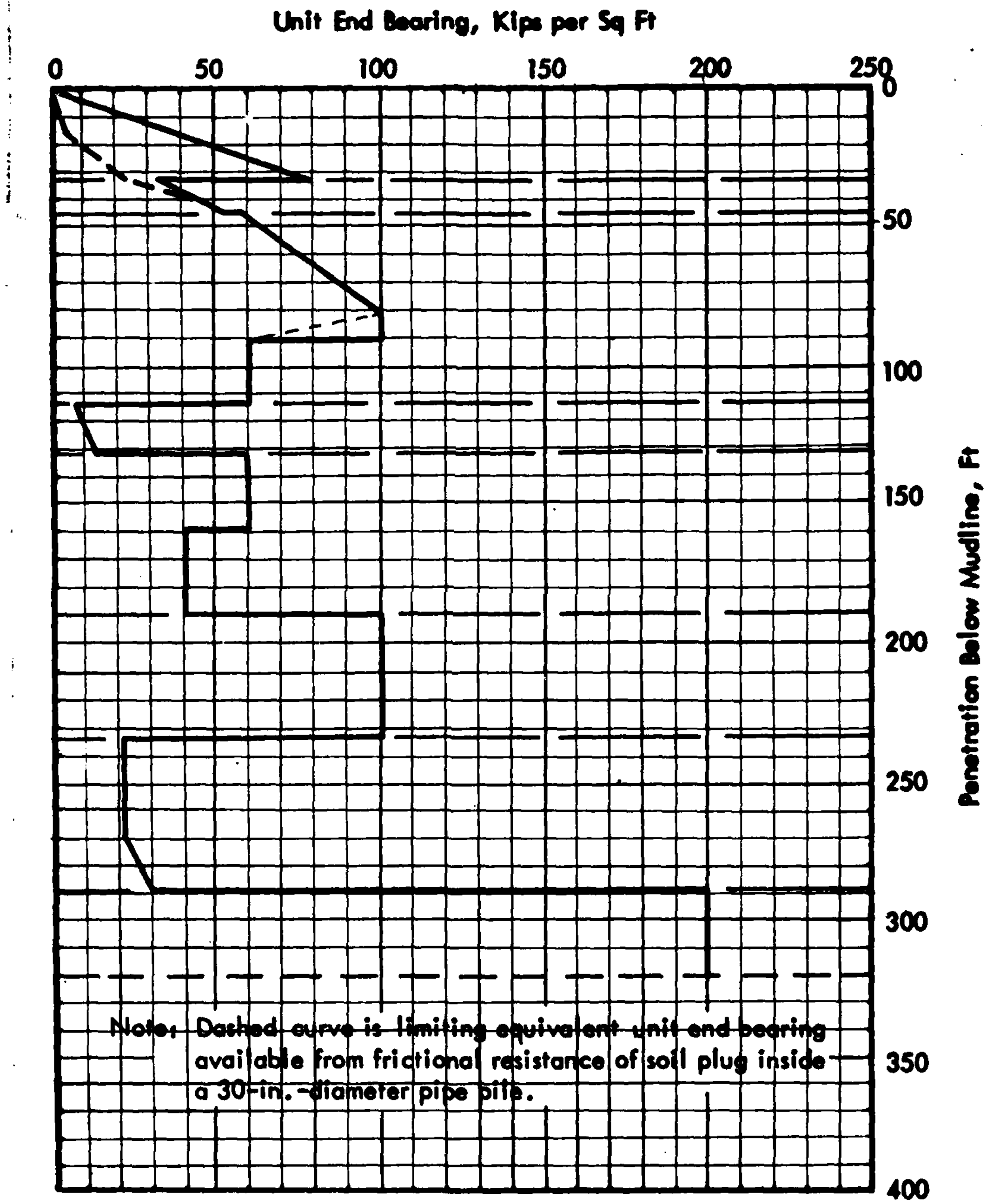
EQUIVALENT UNIT SKIN FRICTION

Boring #2

CREST OFFSHORE, INC.

Sheet 2-25 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



UNIT END BEARING

Boring #2

CREST OFFSHORE, INC.

Sheet 2.26 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #2

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 15	0 0.30	0 4.0	15
15 33	0.30 0.70	4.0 24.0	18
33 40	2.15 2.27	24.0 45.0	7
40 45	2.27 2.40	45.0 53.0	5
45 82	0.90 1.70	58.0 100.0	37
82 91	1.70 1.70	100.0 100.0	9
91 114	1.40 1.40	60.0 60.0	23
114 132	0.90 0.90	7.0 13.0	18
132 160	1.40 1.40	60.0 60.0	28
160 190	1.00 1.00	40.0 40.0	30
190 235	1.62 1.70	100.0 22.0	45
235 270	1.80 2.20	22.0 22.0	35
270 290	2.20 2.35	22.0 30.0	20
290 320	2.00 2.00	200.0 200.0	30

Σ 320 FT

UNIT CAPACITY IN COMPRESSION

CREST OFFSHORE, INC.

Sheet 227 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #2

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 15	0 0.20	–	15
15 33	0.20 0.50	–	18
33 40	2.15 2.27	–	7
40 45	2.27 2.40	–	5
45 82	0.70 0.44	–	37
82 91	0.44 1.25	–	9
91 114	1.00 1.20	–	23
114 132	0.90 0.90	–	18
132 160	1.40 1.40	–	28
160 190	1.00 1.00	–	30
190 235	1.65 1.70	–	45
235 270	1.80 2.20	–	35
270 290	2.20 2.35	–	20
290 320	2.00 2.00	–	30

Σ 320 FT

UNIT CAPACITY IN TENSION

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

-- COMPRESSION -- O.D. = 42"

(Boring #2) $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 15	0 0.30	0.15	15	24.7	0 24.7
15 33	0.30 0.70	0.50	18	99.0	123.7
33 40	2.15 2.27	2.21	7	170.1	293.8
40 45	2.27 2.40	2.33	5	128.1	421.9
45 82	0.90 1.70	1.30	37	528.9	950.8
82 91	1.70 1.70	1.70	9	168.2	1,119.0
91 114	1.40 1.40	1.40	23	354.1	1,473.1
114 132	0.90 0.90	0.90	18	178.1	1,651.2
132 160	1.40 1.40	1.40	28	431.0	2,082.2
160 190	1.00 1.00	1.00	30	329.9	2,412.1
190 235	1.62 1.70	1.66	45	821.4	3,233.5
235 270	1.80 2.20	2.00	35	769.7	4,003.2
270 290	2.20 2.35	2.27	20	499.2	4,502.4
290 320	2.00 2.00	2.00	30	659.8	5,162.2

CREST OFFSHORE, INC.

Sheet 2-29 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 22-771-97 Calculation Pipe Pile Capacity Curves
BORING #2

END BEARING CAPACITY ($Q_p = q A_p$)

$A_p = \frac{\pi}{4}(42)^2/144 = 9.62$ SQ. FT

PENETRATION BELOW MUDLINE	UNIT END BEARING	END BEARING
FT	KSF	KIPS
0	0	0
15	4.0	38.5
15	4.0	
33	24.0	230.9
33	24.0	
40	45.0	432.9
40	45.0	
45	53.0	509.9
45	58.0	558.0
82	100.0	962.0
82	100.0	
91	100.0	
91	60.0	577.2
114	60.0	
114	7.0	67.3
132	13.0	125.1
132	60.0	577.2
160	60.0	
160	40.0	384.8
190	40.0	
190	100.0	962.0
235	100.0	
235	22.0	211.6
270	22.0	
270	22.0	
290	30.0	288.6
290	200.0	1,924.0
320	200.0	

CREST OFFSHORE, INC.

Sheet 2.30 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN COMPRESSION (Boring #2)

PENETRATION BELOW MUDLINE	SKIN FRICTION	END BEARING	ULTIMATE CAPACITY	DESIGN CAPACITY (F.S.=1.5)
FT	KIPS	KIPS	KIPS	KIPS
0	0	0	0	0
15	24.7	38.5	63.2	42.1
15				
33	123.7	230.9	354.6	236.4
33				
40	293.8	432.9	726.7	484.5
40				
45	421.9	509.9	931.8	621.2
45		558.0	979.9	653.3
82	950.8	962.0	1,912.8	1,275.2
82				
91	1,119.0		2,081.0	1,387.3
91		577.2	1,696.2	1,130.8
114	1,473.1		2,050.3	1,366.9
114		67.3	1,540.4	1,026.9
132	1,651.2	125.1	1,776.3	1,184.2
132		577.2	2,228.4	1,485.6
160	2,082.2		2,659.4	1,772.9
160		384.8	2,467.0	1,644.7
190	2,412.1		2,796.9	1,864.6
190		962.0	3,374.1	2,249.4
235	3,233.5		4,195.5	2,797.0
235		211.6	3,445.1	2,296.7
270	4,003.2		4,214.8	2,809.9
270				
290	4,502.4	288.6	4,791.0	3,194.0
290		1,924.0	6,426.4	4,284.3
320	5,162.2		7,086.2	4,724.1

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

-- TENSION --

O.D. = 42"

BORING #2

$A_s = \pi D (\Delta \ell) = 10.996 (\Delta \ell)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH ($\Delta \ell$)	SKIN FRICTION IN SEGMENT	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 15	0 0.20	0.10	15	16.5	0 16.5
15 33	0.20 0.50	0.35	18	69.3	85.8
33 40	2.15 2.27	2.21	7	170.1	255.9
40 45	2.27 2.40	2.33	5	128.1	384.0
45 82	0.70 0.44	0.57	37	231.9	615.9
82 91	0.44 1.25	0.84	9	83.1	699.0
91 114	1.00 1.20	1.10	23	278.2	977.2
114 132	0.90 0.90	0.90	18	178.1	1,155.3
132 160	1.40 1.40	1.40	28	431.0	1,586.3
160 190	1.00 1.00	1.00	30	329.9	1,916.2
190 235	1.65 1.70	1.67	45	826.3	2,742.5
235 270	1.80 2.20	2.00	35	769.7	3,512.2
270 290	2.20 2.35	2.27	20	499.2	4,011.4
290 320	2.00 2.00	2.00	30	659.8	4,671.2

CREST OFFSHORE, INC.

Sheet 2.32 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN TENSION (Boring #2)

PENETRATION BELOW MUDLINE	ULTIMATE CAPACITY	DESIGN CAPACITY (F.S.=1.5)
FT	KIPS	KIPS
0 15	0 16.5	0 11.0
15 33	85.8	57.2
33 40	255.9	170.6
40 45	384.0	256.0
45 82	615.9	410.6
82 91	699.0	466.0
91 114	977.2	651.5
114 132	1,155.3	770.2
132 160	1,586.3	1,057.5
160 190	1,916.2	1,277.5
190 235	2,742.5	1,828.3
235 270	3,512.2	2,341.5
270 290	4,011.4	2,674.3
290 320	4,671.2	3,114.1

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves
BORING #2

Modification on Unit End Bearing Capacity

42" $3-D = 10.5^{ft}$

$A_p = 9.62$ SQ. FT

Boring #2

(i) At penetration 80.5 FT (=91'-10.5')

End Bearing $Q_p = (100\text{ ksf}) \times (9.62) = 962$ KIPS

Skin Friction $Q_s = 950.8$ KIPS (taken at 82 FT)

Ultimate Capacity $Q = 962 + 950.8 = 1{,}912.8$

Design Capacity $Q_d = 1{,}274.8$ KIPS

(ii) At Penetration 103.5 FT (=114'-10.5')

End Bearing $Q_p = (60\text{ KSF}) \times (9.62) = 577.2$ KIPS

Skin Friction $Q_s = 1119.0 + 354.1 \times \frac{103.5-91}{23} = 1{,}311.4$ KIPS

Ultimate Capacity $Q = 577.2 + 1{,}311.4 = 1{,}888.6$ KIPS

Design Capacity $Q_d = 1{,}259.1$ KIPS

CREST OFFSHORE, INC.

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-91 Calculation Pipe Pile Capacity Curves
BORING #2

(iii) At penetration 142.5 FT (=132' + 10.5')

End Bearing $Q_p = (60\ KSF) \times (9.62) = 577.2$ KIPS

Skin Friction $Q_s = 1651.2 + 431 \times \frac{10.5}{28} = 1,812.8$ KIPS

Ultimate Capacity $Q = 577.2 + 1,812.8 = 2,390.0$ KIPS

Design Capacity $Q_d = 1,593.3$ KIPS

(iv) At Penetration 149.5 FT (=160' - 10.5')

End Bearing $Q_p = (60\ KSF) \times (9.62) = 577.2$ KIPS

Skin Friction $Q_s = 1651.2 + 431 \times \frac{149.5 - 132}{28} = 1,920.6$ KIPS

Ultimate Capacity $Q = 577.2 + 1,920.6 = 2,497.8$ KIPS

Design Capacity $Q_s = 1,665.2$ kips

(v.) At Penetration 200.5 FT (=190' + 10.5')

End Bearing $Q_p = (100\ KSF) \times (9.62) = 962$ KIPS

Skin Friction $Q_s = 2412.1 + 821.4 \times \frac{10.5}{45} = 2,603.8$ KIPS

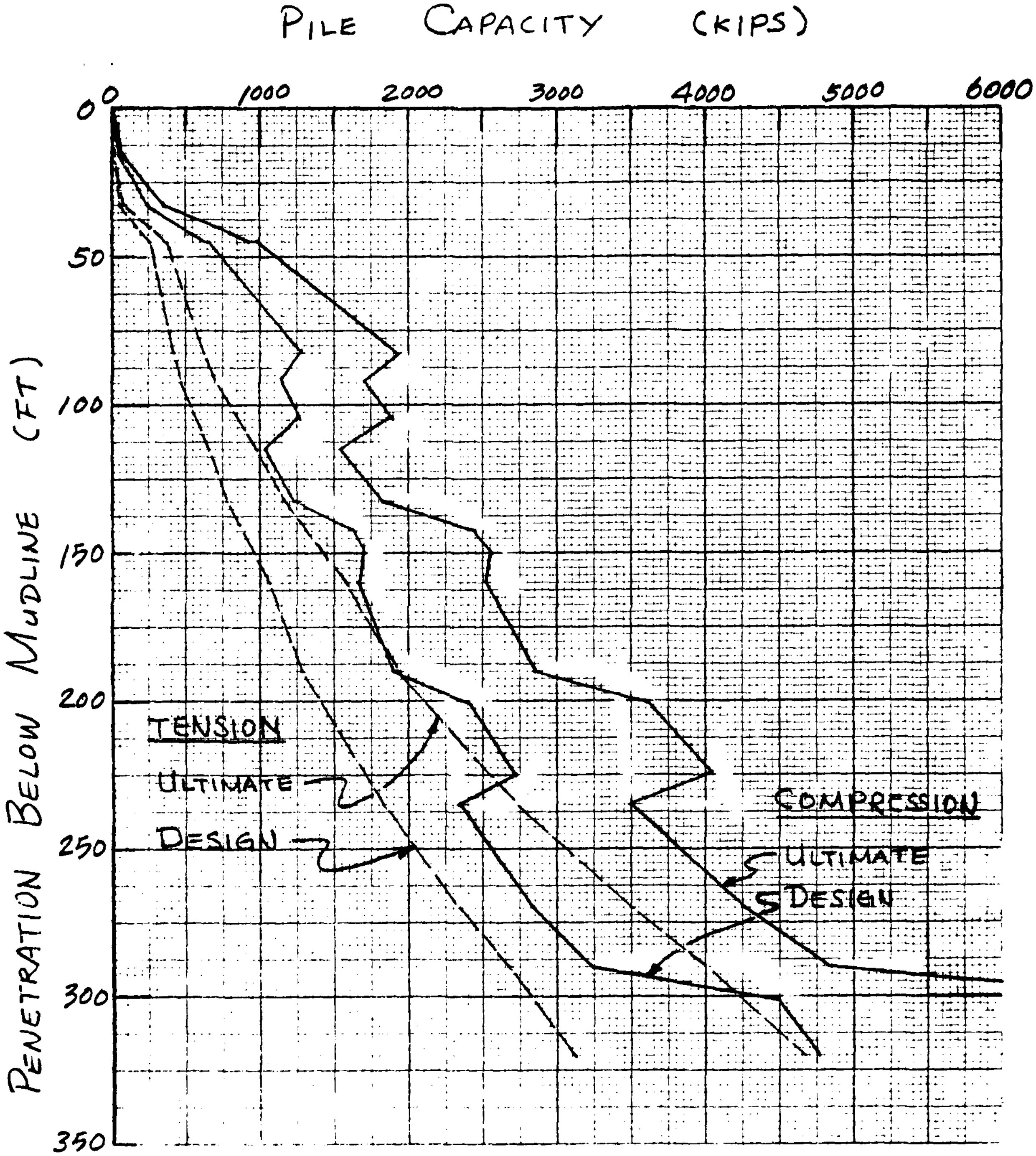
Ultimate Capacity $Q = 962 + 2,603.8 = 3,565.8$ KIPS

Design Capacity $Q_d = 2377.2$

CREST OFFSHORE, INC.

Sheet 2.36 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

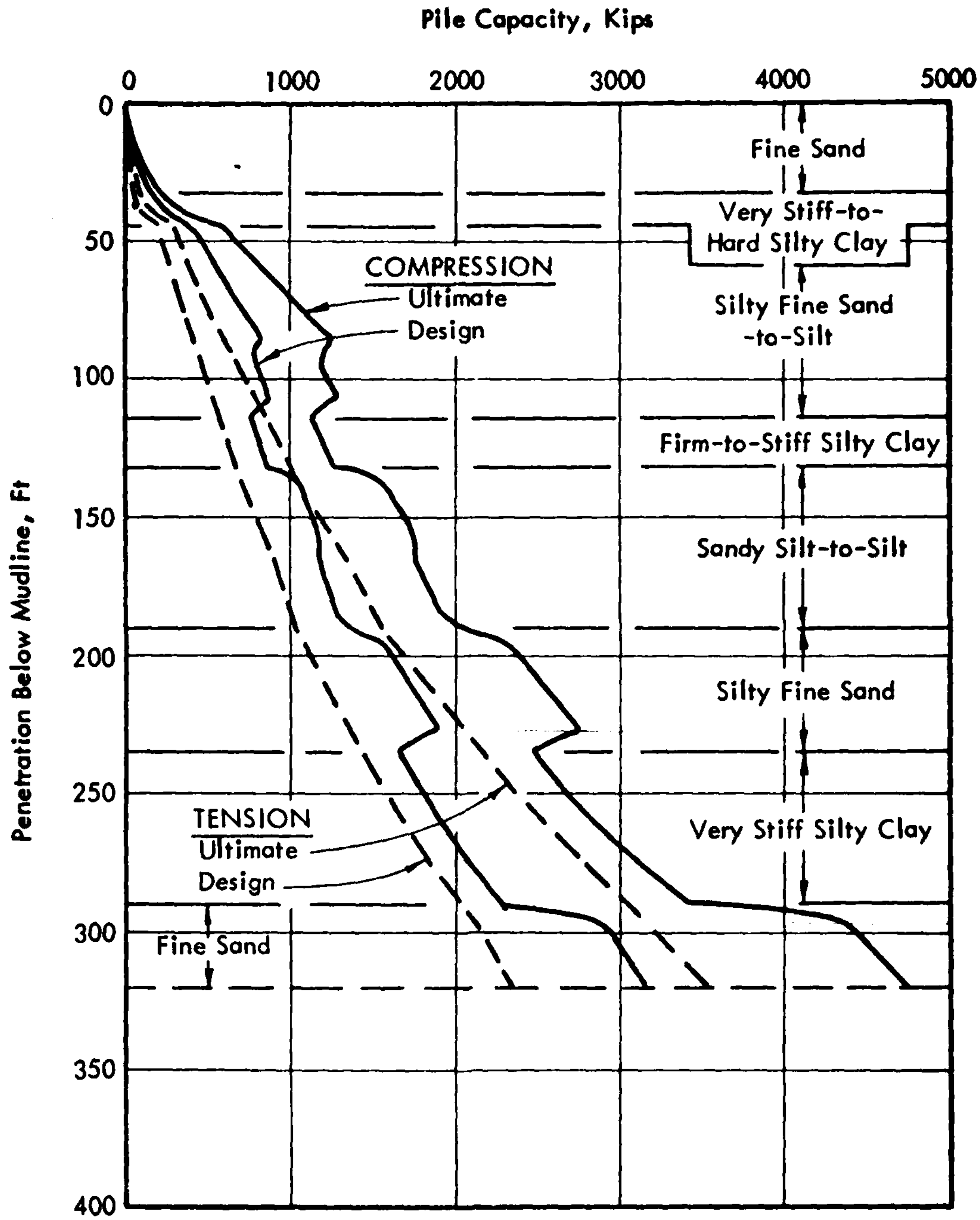


42-IN. DIAMETER PIPE PILES

(Boring #2)

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-77L-97 Calculation Pipe Pile Capacity Curves



PILE CAPACITY CURVES
30-in. Diameter Pipe Piles
Boring 2

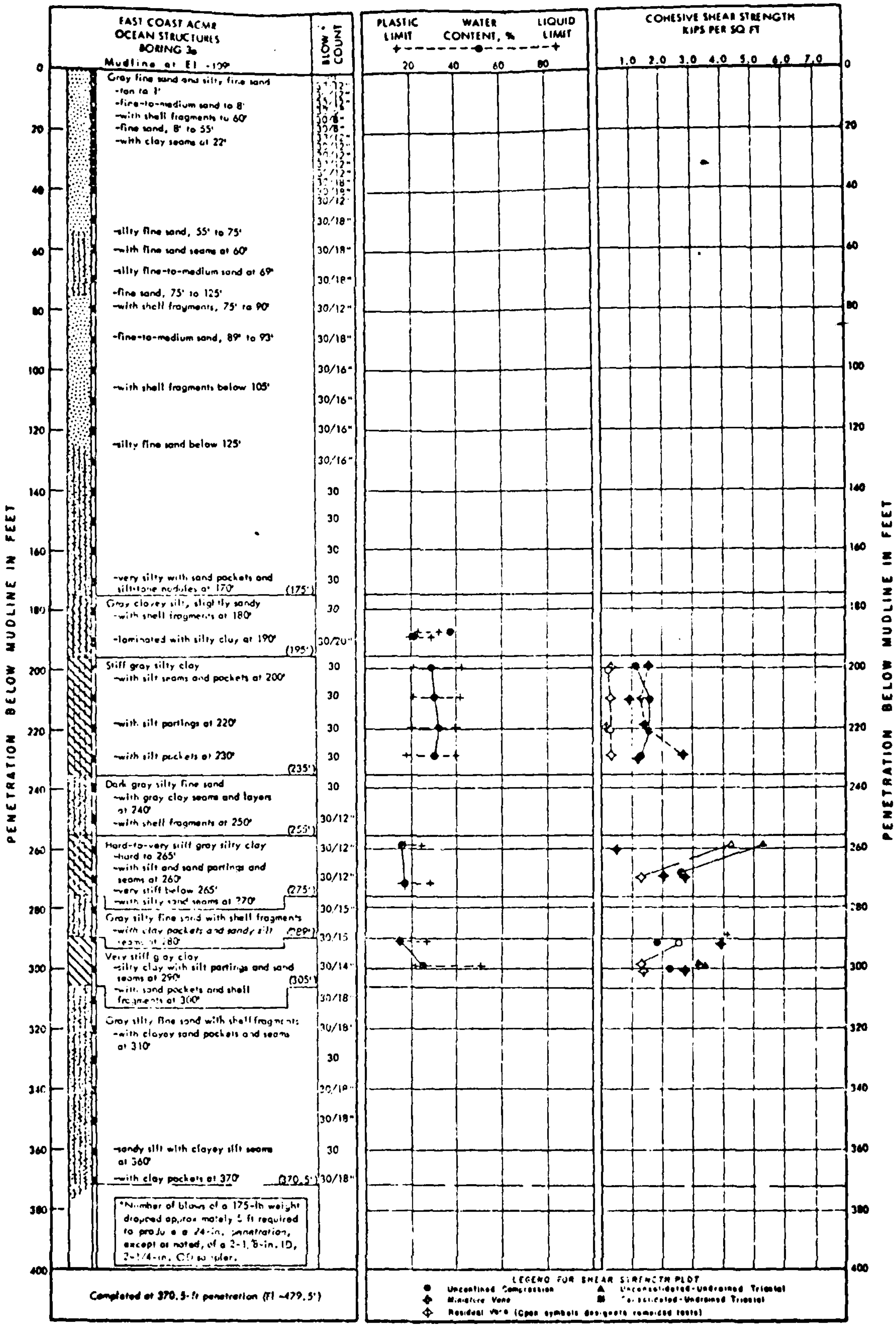
2.4 CAPACITY CURVES FOR BORING SITE NO. 3A

CREST OFFSHORE, INC.

Sheet 2.39 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



LOG OF BORING AND TEST RESULTS

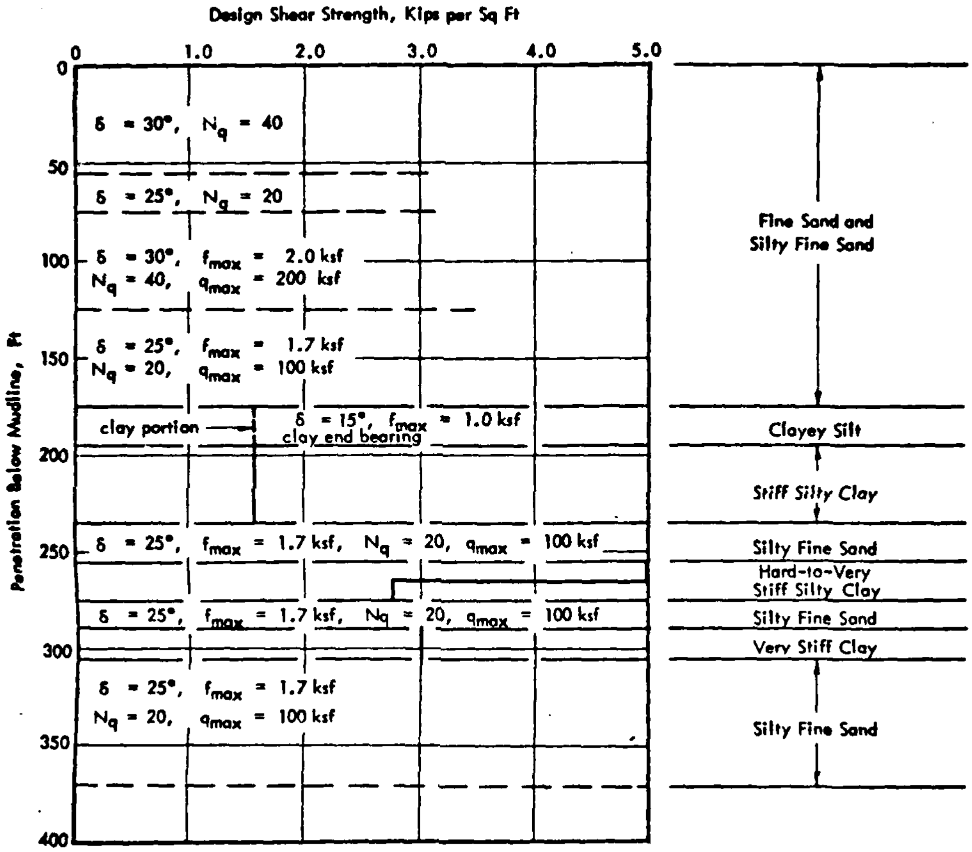
BORING # 3A

CREST OFFSHORE, INC.

Sheet 2.40 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #3A



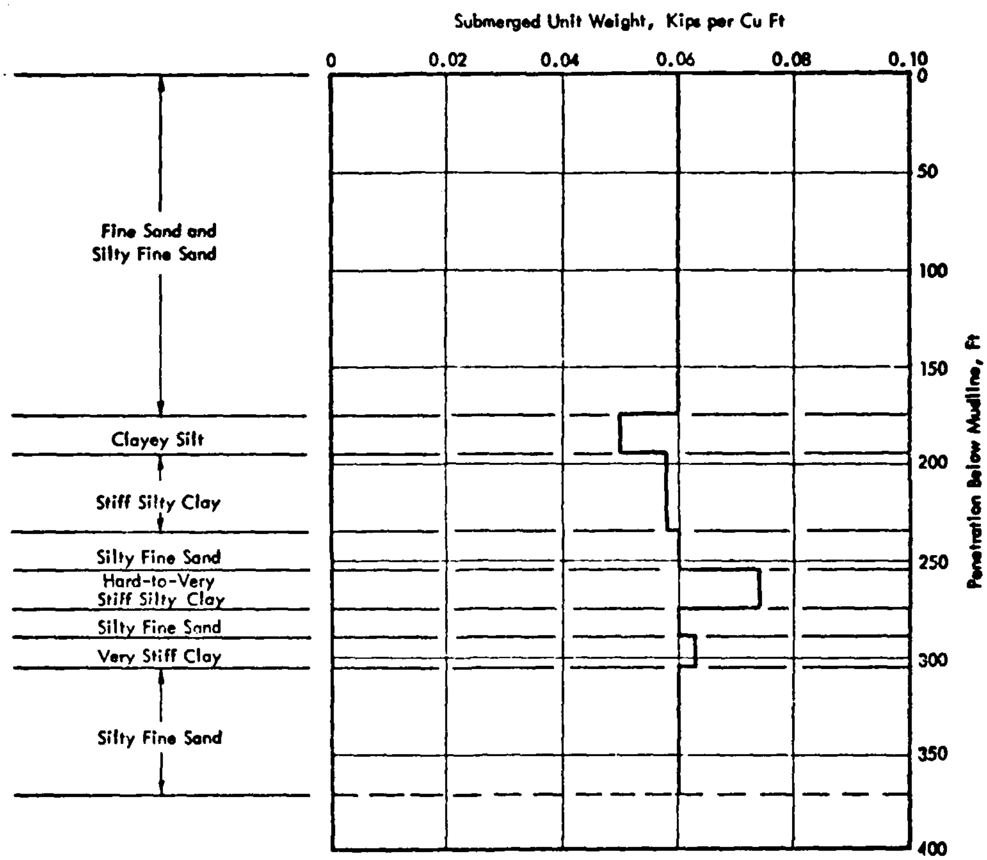
STRENGTH PARAMETERS

CREST OFFSHORE, INC.

Sheet 2.41 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #3A

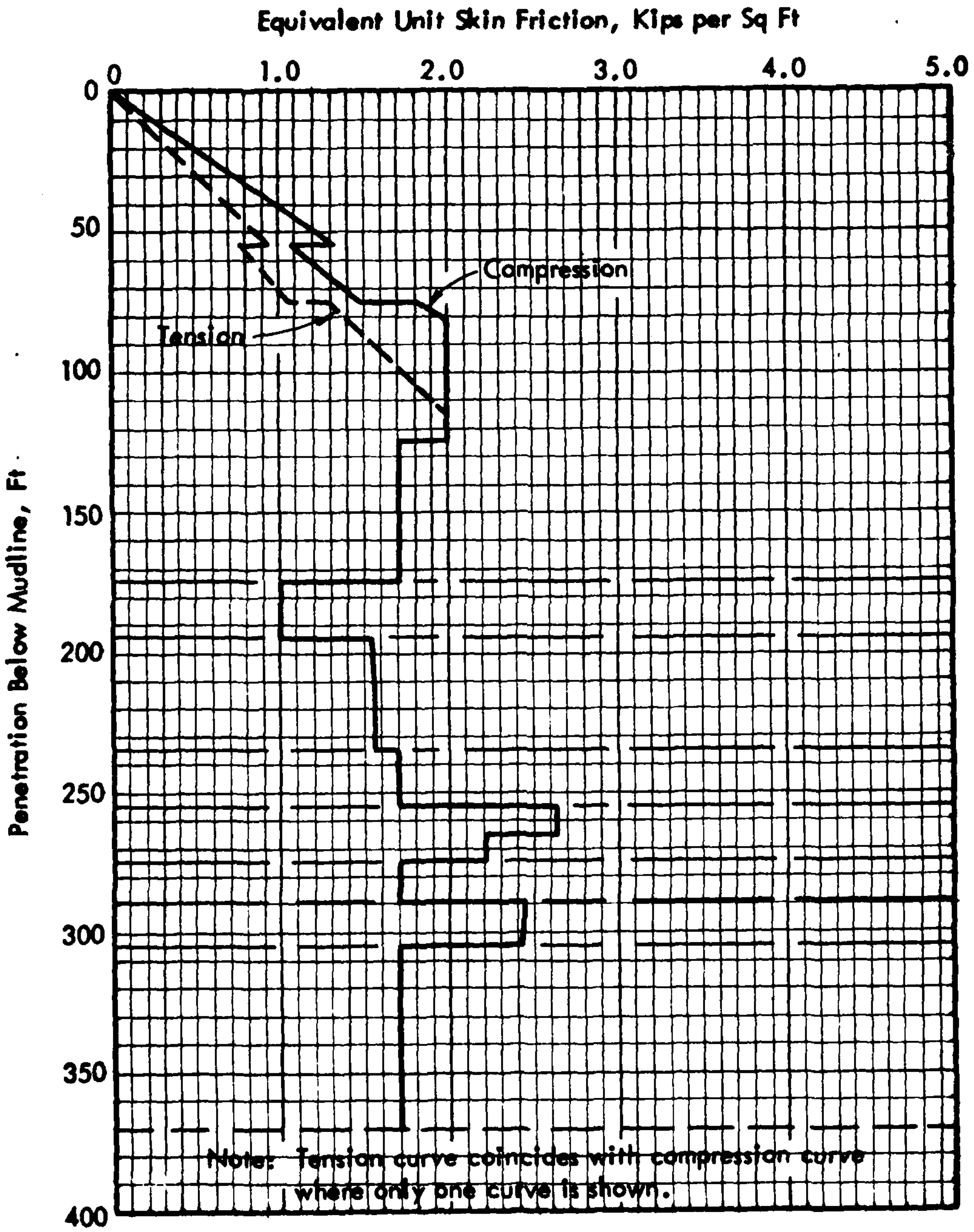


SUBMERGED UNIT WEIGHT

CREST OFFSHORE, INC.

Sheet 2.42 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



EQUIVALENT UNIT SKIN FRICTION

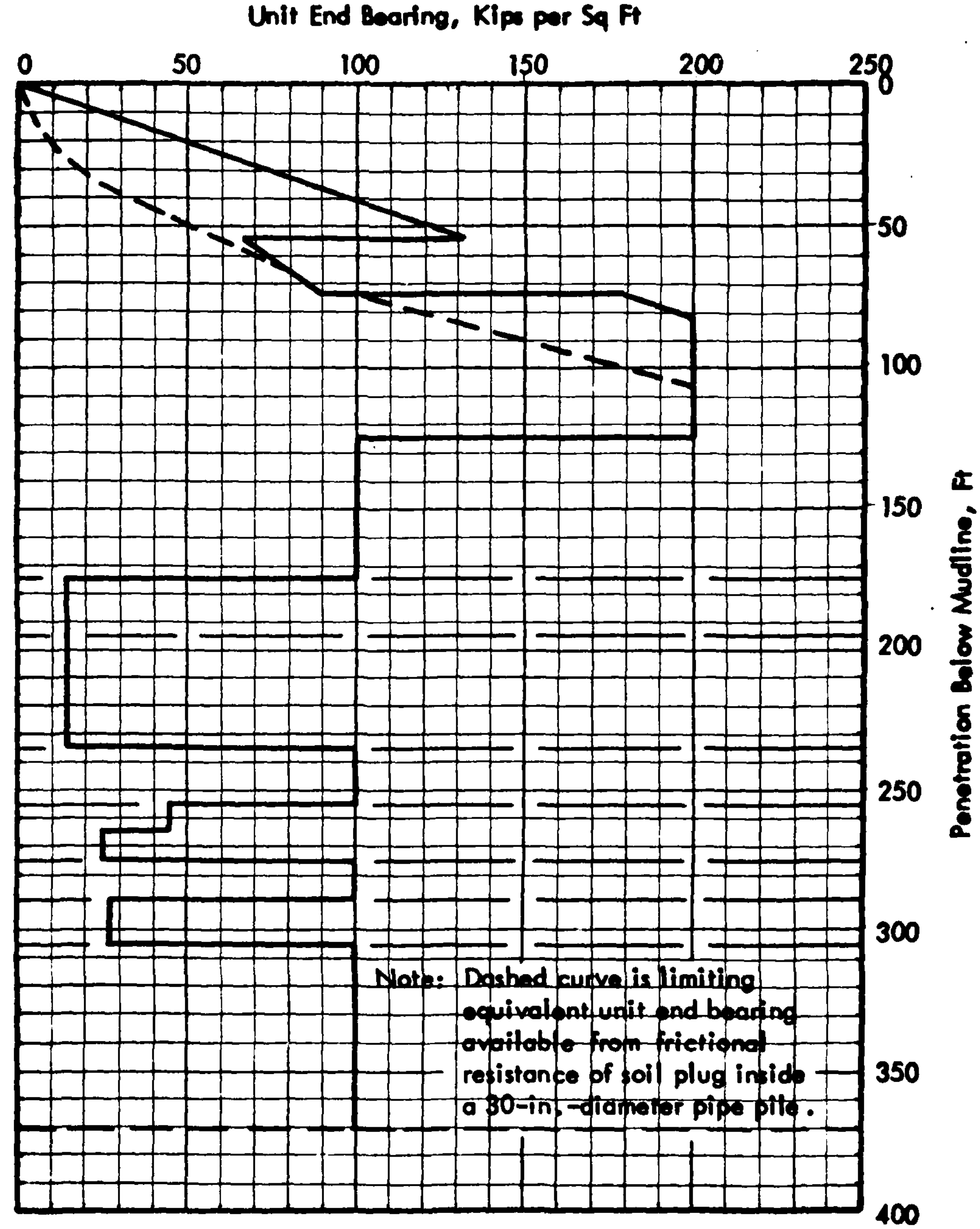
Boring #3A

CREST OFFSHORE, INC.

Sheet 2.43 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-L-76 Job No. 27-171-97 Calculation Pipe Pile Capacity Curves



UNIT END BEARING

Boring # 3A

CREST OFFSHORE, INC.

By C. Cherr Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #3A

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 20	0 0.5	0 10.0	20
20 35	0.85	24.0	15
35 55	1.30	60.0	20
55 65	1.10 1.30	80.0	10
65 75	1.50	90.0	10
75 82	1.80 2.00	100.0 125.0	7
82 106	2.00	200.0	24
106 115	2.00	200.0	9
115 125	2.00	200.0	10
125 175	1.70 1.70	100.0 100.0	50
175 195	1.00 1.00	14.0 14.0	20
195 235	1.53 1.57	14.0	40
235 255	1.70 1.70	100.0 100.0	20
255 265	2.63 2.63	45.0 45.0	10
265 275	2.20 2.20	25.0 25.0	10
275 290	1.70 1.70	100.0 100.0	15
290 305	2.45 2.40	27.0 27.0	15
305 370	1.70 1.70	100.0 100.0	65
			Σ370

UNIT CAPACITY IN COMPRESSION

By S. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #3A

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 20	0 0.35	–	20
20 35	0.60	–	15
35 55	0.90	–	20
55 65	0.80 0.92	–	10
65 75	1.05	–	10
75 82	1.30 1.42	–	7
82 106	1.80	–	24
106 115	2.00	–	9
115 125	2.00	–	10
125 175	1.70 1.70	–	50
175 195	1.00 1.00	–	20
195 235	.1.53 1.57	–	40
235 255	1.70 1.70	–	20
255 265	2.63 2.63	–	10
265 275	2.20 2.20	–	10
275 290	1.70 1.70	–	15
290 305	2.45 2.40	–	15
305 370	1.70 1.70	–	65
			Σ370

UNIT CAPACITY IN TENSION

CREST OFFSHORE, INC.

Sheet [illegible] of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-77L-97 Calculation Pipe Pile Capacity Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

-- COMPRESSION -- $O.D. = 42''$

(Boring #3A) $A_s = \pi D (\Delta \ell) = 10.996 (\Delta \ell)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH ($\Delta \ell$)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 20	0. 0.5	0.25	20	55.0	0 55.0
20 35	0.5 0.85	0.67	15	110.5	165.5
35 55	0.85 1.30	1.07	20	235.3	400.8
55 65	1.10 1.30	1.20	10	131.9	532.7
65 75	1.30 1.50	1.40	10	153.9	686.6
75 82	1.80 2.00	1.90	7	146.2	832.8
82 106	2.00 2.00	2.00	24	527.8	1,360.6
106 115	2.00 2.00	2.00	9	197.9	1,558.5
115 125	2.00 2.00	2.00	10	219.9	1,778.4
125 175	1.70 1.70	1.7	50	934.7	2,713.1
175 195	1.00 1.00	1.0	20	219.9	2,933.0
195 235	1.53 1.57	1.55	40	681.8	3,614.8
235 255	1.70 1.70	1.70	20	373.9	3,988.7
255 265	2.63 2.63	2.63	10	289.2	4,277.9
265 275	2.20 2.20	2.20	10	241.9	4,519.8
275 290	1.70 1.70	1.70	15	280.4	4,800.2
290 305	2.45 2.40	2.42	15	399.2	5,199.4
305 370	1.70 1.70	1.70	65	1,215.1	6,414.5
			Σ 370		

CREST OFFSHORE, INC.

Sheet 2.47 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

BORING # 3A

END BEARING CAPACITY ($Q_p = q A_p$) $A_p = 9.62$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT END BEARING	END BEARING
FT	KSF	KIPS
0 20	0 10.0	96.2
20 35	24.0	230.9
35 55	60.0	577.2
55 65	80.0	769.6
65 75	90.0	865.8
75 82	100.0 125.0	962.0 1,202.5
82 106	200.0	1,924.0
106 115	200.0	
115 125	200.0	
125 175	100.0 100.0	962.0
175 195	14.0	134.7
195 235	14.0	
235 255	100.0 100.0	962.0
255 265	45.0 45.0	432.9
265 275	25.0 25.0	240.5
275 290	100.0 100.0	962.0
290 305	27.0 27.0	259.7
305 370	100.0 100.0	962.0

CREST OFFSHORE, INC.

Sheet 2-43 of 78

By C. Chern Client U. S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN COMPRESSION (Boring #3A)

PENETRATION BELOW MUDLINE	SKIN FRICTION	END BEARING	ULTIMATE CAPACITY	DESIGN CAPACITY (F.S.=1.5)
FT	KIPS	KIPS	KIPS	KIPS
0 20	0 55.0	96.2	151.2	100.8
20 35	165.5	230.9	396.4	264.3
35 55	400.8	577.2	978.0	652.0
55 65	532.7	769.6	1,302.3	868.2
65 75	686.6	865.8	1,552.4	1,034.9
75 82	832.8	962.0 1,202.5	1,648.6 2,035.3	1,099.1 1,356.9
82 106	1,360.6	1,924.0	3,284.6	2,189.7
106 115	1,558.5		3,482.5	2,321.7
115 125	1,778.4		3,702.4	2,468.3
125 175	2,713.1	962.0	2,740.4 3,675.1	1,826.9 2,450.1
175 195	2,933.0	134.7	2,847.8 3,067.7	1,898.5 2,045.1
195 235	3,614.8		3,749.5	2,499.7
235 255	3,988.7	962.0	4,576.8 4,950.7	3051.2 3,300.5
255 265	4,277.9	432.9	4,421.6 4,710.8	2,947.7 3,140.5
265 275	4,519.8	240.5	4,518.4 4,760.3	3,012.3 3,173.5
275 290	4,800.2	962.0	5,481.8 5,762.2	3,654.5 3,841.5
290 305	5,199.4	259.7	5,059.9 5,459.1	3,373.3 3,639.4
305 370	6,414.5	962.0	6,161.4 7,376.5	4,107.6 4,917.7

CREST OFFSHORE, INC.

Sheet 3-49 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves
BORING #3A

SKIN FRICTION CAPACITY ($Q_s = f_{as} \cdot A_s$)

$O.D. = 42''$

-- Tension --

$A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 20	0 0.35	0.17	20	37.4	0 37.4
20 35	0.35 0.60	0.47	15	77.5	114.9
35 55	0.60 0.90	0.75	20	164.9	279.8
55 65	0.80 0.92	0.86	10	94.6	374.4
65 75	0.92 1.05	0.98	10	107.8	482.2
75 82	1.30 1.42	1.36	7	104.7	586.9
82 106	1.42 1.80	1.61	24	424.9	1,011.8
106 115	~~2.00~~ 1.80 2.00	~~2.0~~ 1.90	9	~~197.9~~ 188.0	1,199.8
115 125	2.00 2.00	2.0	10	219.9	1,419.7
125 175	1.70 1.70	1.7	50	934.7	2,354.4
175 195	1.00 1.00	1.0	20	219.9	2,574.3
195 235	1.53 1.57	1.55	40	681.8	3,256.1
235 255	1.70 1.70	1.70	20	373.9	3,630.0
255 265	2.63 2.63	2.63	10	289.2	3,919.2
265 275	2.20 2.20	2.20	10	241.9	4,161.1
275 290	1.70 1.70	1.70	15	280.4	4,441.5
290 305	2.45 2.40	2.42	15	399.2	4,840.7
305 370	1.70 1.70	1.70	65	1,215.1	6,055.8
			Σ 370		

CREST OFFSHORE, INC.

Sheet 2.50 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN TENSION (Boring #3A)

PENETRATION BELOW MUDLINE	ULTIMATE CAPACITY	DESIGN CAPACITY (F.S.=1.5)
FT	KIPS	KIPS
0–20	0 37.4	24.9
20–35	114.9	76.6
35–55	279.8	186.5
55–65	374.4	249.6
65–75	482.2	321.5
75–82	586.9	391.3
82–106	1,011.8	674.5
106–115	1,199.8	799.9
115–125	1,419.7	946.5
125–175	2,354.4	1,569.6
175–195	2,574.3	1,716.2
195–235	3,256.1	2,170.7
235–255	3,630.0	2,420.0
255–265	3,919.2	2,612.8
265–275	4,161.1	2,774.1
275–290	4,441.5	2,961.0
290–305	4,840.7	3,227.0
305–370	6,055.8	4,037.2

CREST OFFSHORE, INC.

Sheet 2.51 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves
BORING # 3A

Modification on Unit End Bearing Capacity

Boring #3A

(i) At penetration 114.5 FT (=125'-10.5')

End Bearing $Q_p = (200\ \text{KSF}) \times (9.62) = 1{,}924$ KIPS

Skin Friction $Q_s = 1{,}558.5$ KIPS (Taken at 115 FT)

Ultimate Capacity $Q = 1{,}924 + 1{,}558.5 = 3{,}482.5$ KIPS

Design Capacity $Q_d = 2{,}321.7$ KIPS

(ii) At Penetration 164.5 FT (=175'-10.5')

End Bearing $Q_p = (100\ \text{KSF}) \times (9.62) = 962$ KIPS

Skin Friction $Q_s = 1{,}778.4 + 934.7 \times \frac{164.5-125}{50} = 2{,}516.8$ KIPS

Ultimate Capacity $Q = 962 + 2{,}516.8 = 3{,}478.8$ KIPS

Design Capacity $Q_d = 2{,}319.2$ KIPS

(iii) At Penetration 245 FT (= 235'+10')

End Bearing $Q_p = (100\ \text{KSF}) \times (9.62) = 962$ KIPS

Skin Friction $Q_s = 3{,}614.8 + \frac{1}{2} \times 374 = 3{,}801.8$ KIPS

Ultimate Capacity $Q = 962 + 3{,}801.8 = 4{,}763.8$ KIPS

Design Capacity $Q_d = 3{,}175.9$ KIPS

CREST OFFSHORE, INC.

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-721-97 Calculation Pipe Pile Capacity Curves
BORING #3A

(iv) At Penetration 315.5 FT (= 305' + 10.5')

End Bearing $Q_p = (100\ \text{KSF}) \times (9.62) = 962$ kips

Skin Friction $Q_s = 5,199.4 + 1,215.1 \times \frac{10.5}{65} = 5,395.7$ KIPS

Ultimate Capacity $Q = 962 + 5,395.7 = 6,357.7$ KIPS

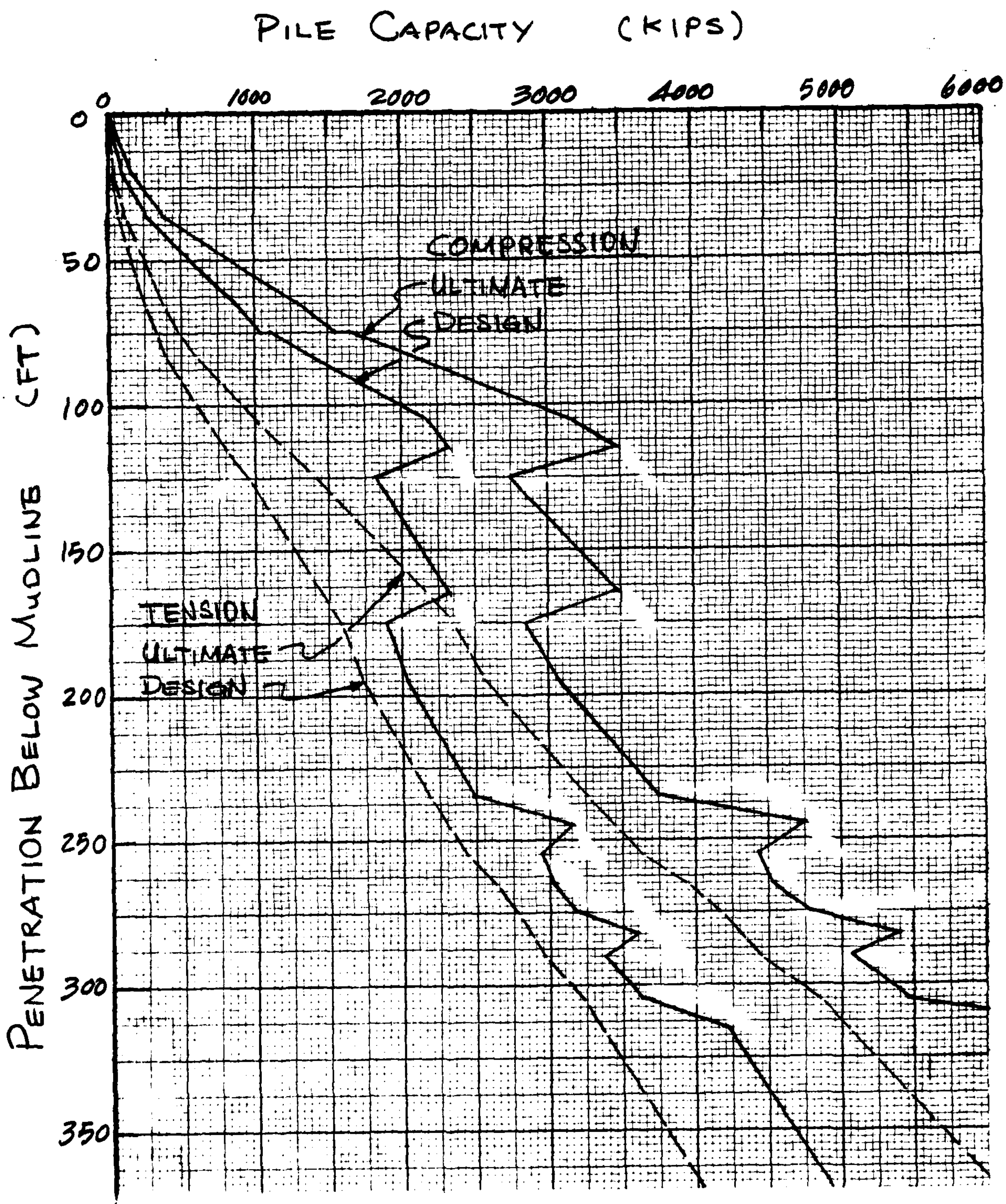
Design Capacity $Q_d = 4,238.5$ KIPS

CREST OFFSHORE, INC.

Sheet 2.53 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



42-IN. DIAMETER PIPE PILES

(Boring #3A)

CREST OFFSHORE, INC.

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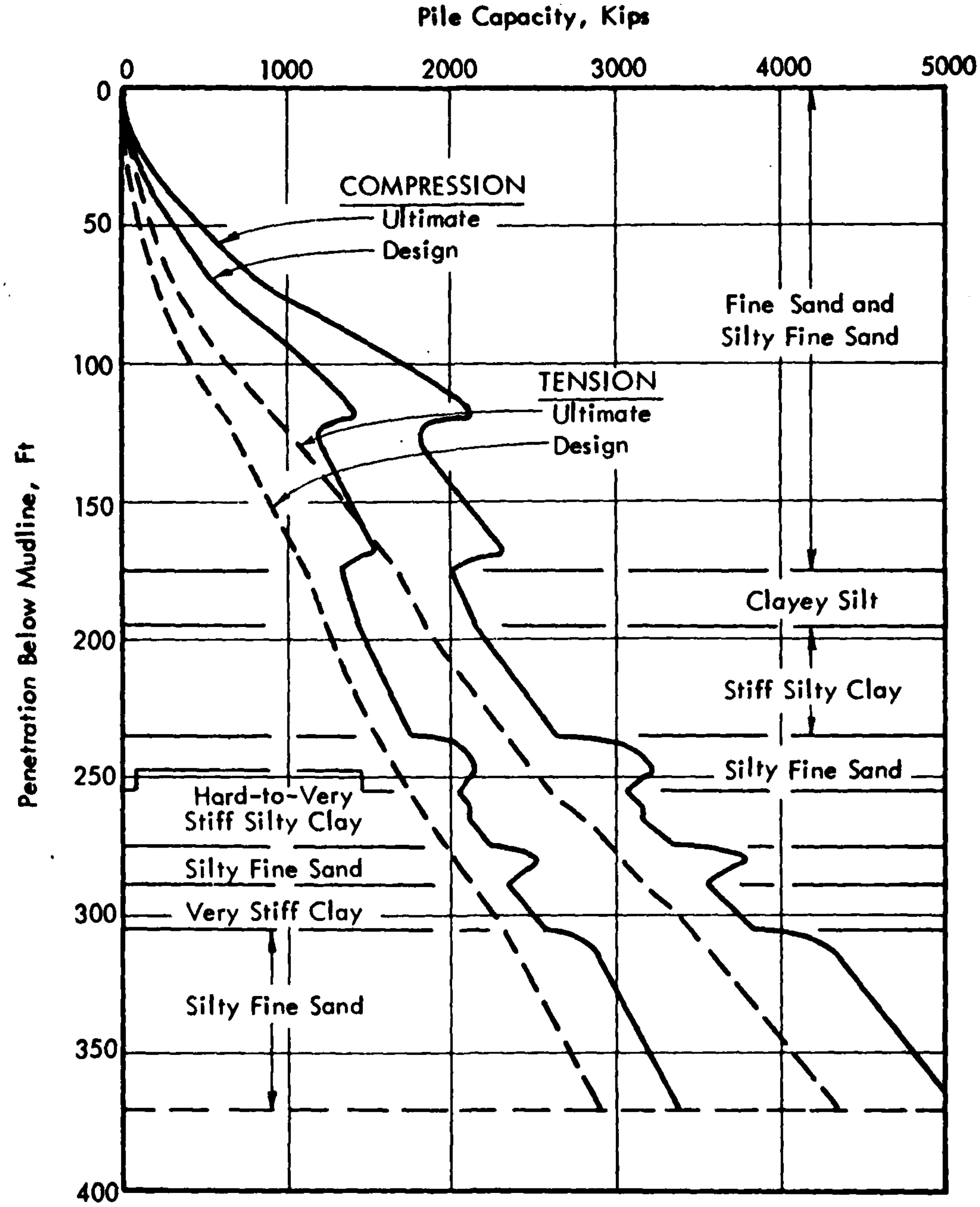
By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

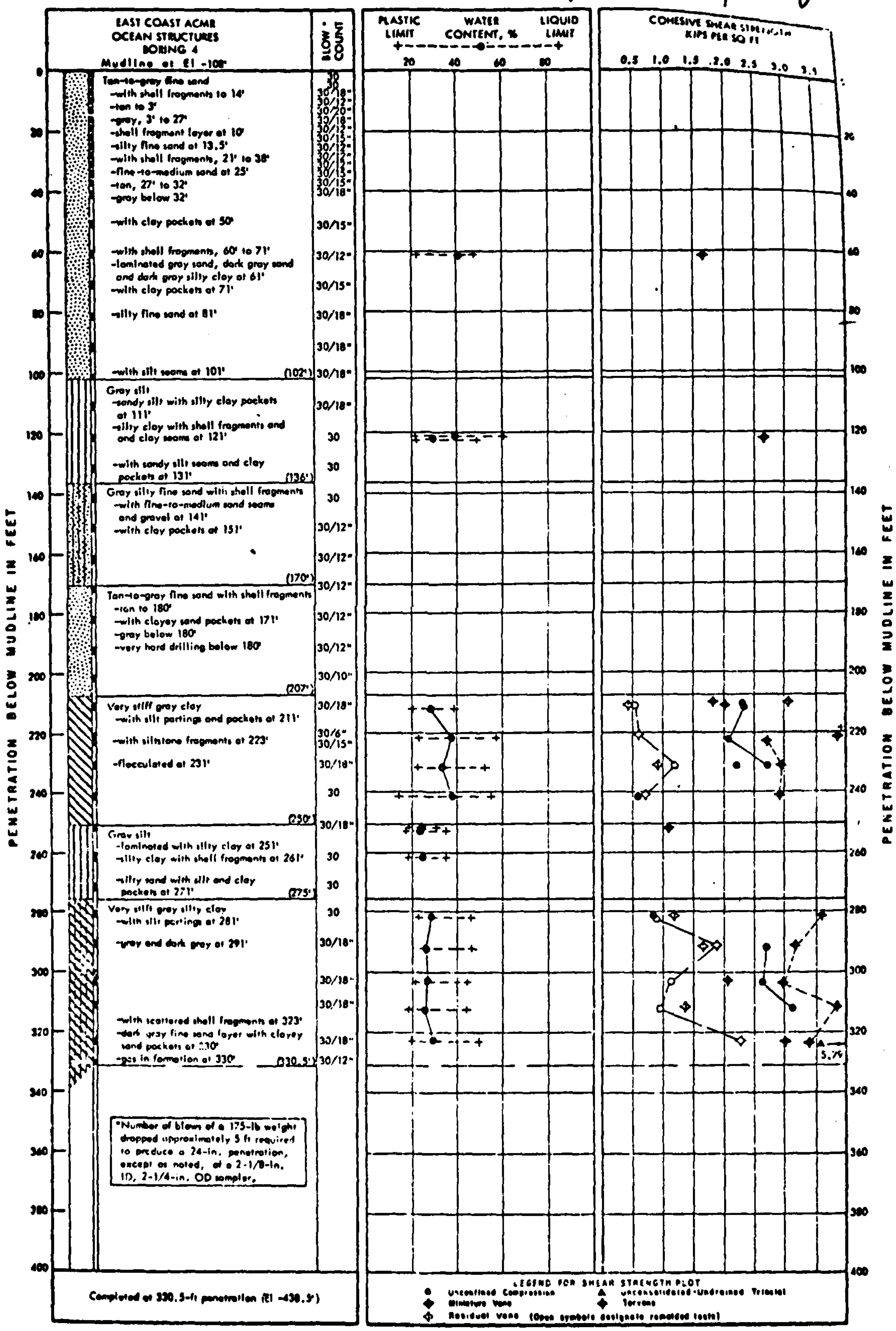


PILE CAPACITY CURVES
30-in. Diameter Pipe Piles
Boring 3a

2.5 CAPACITY CURVES FOR BORING SITE NO. 4

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



BORING #4

LOG OF BORING AND TEST RESULTS

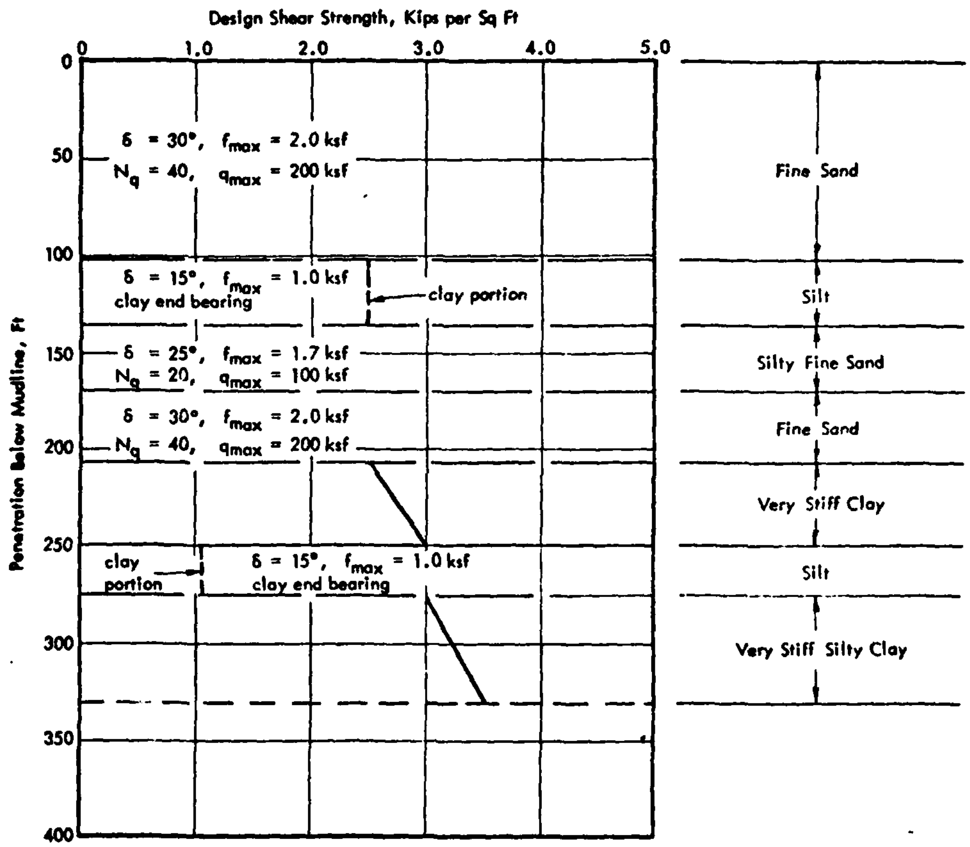
CREST OFFSHORE, INC.

Sheet 2.57 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #4



STRENGTH PARAMETERS

CREST OFFSHORE, INC.

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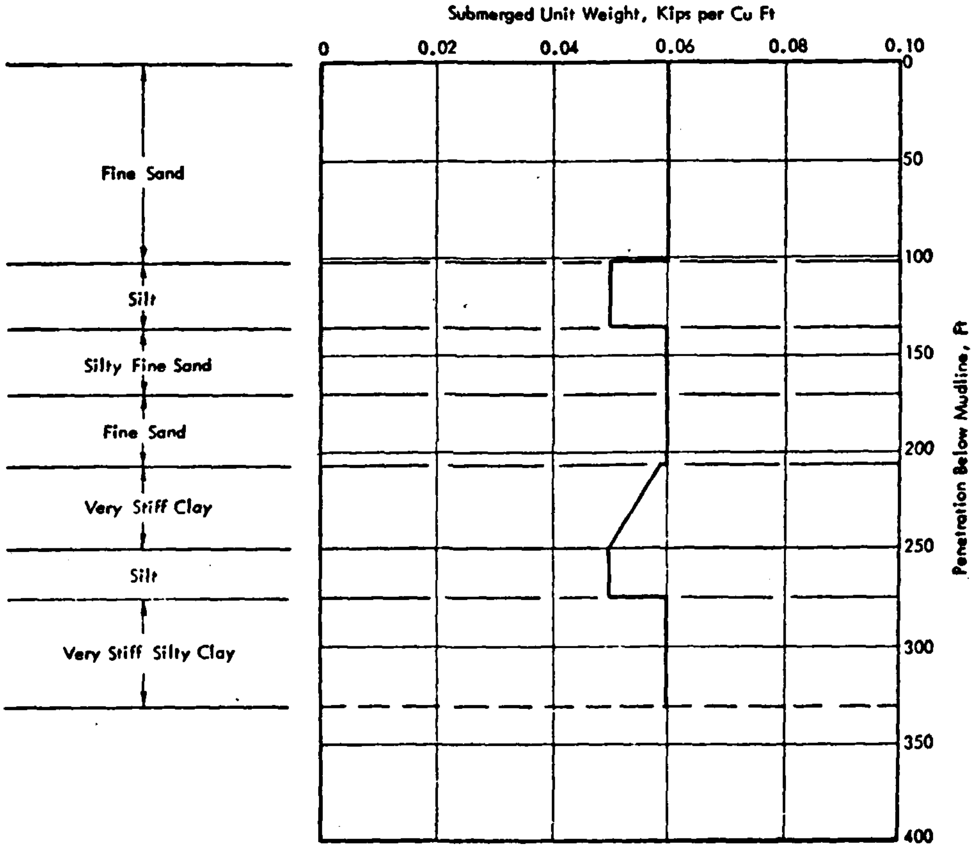
By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #4

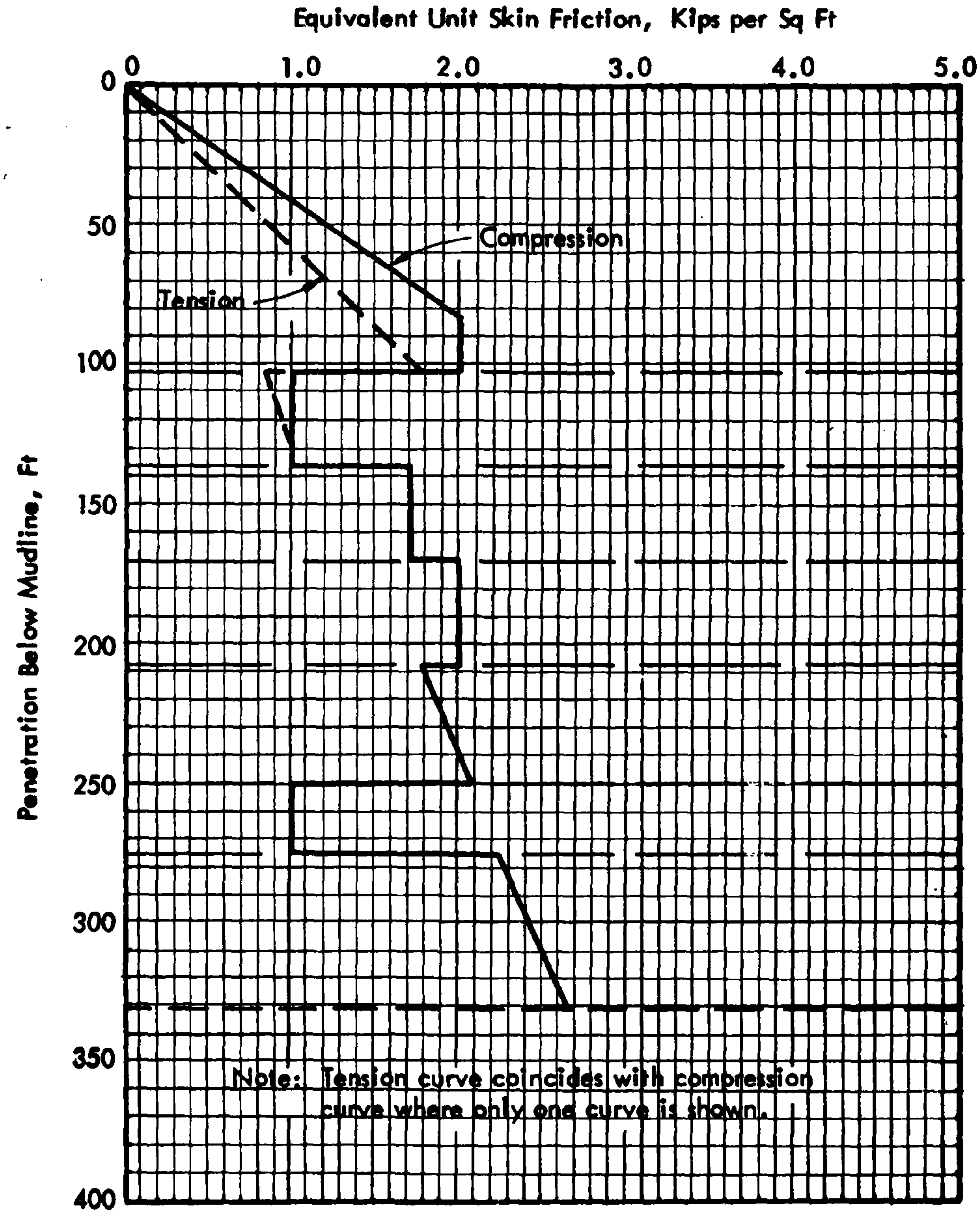


SUBMERGED UNIT WEIGHT

CREST OFFSHORE, INC.

By S. Chern Client U. S. NAVY Subject Foundation Analysis

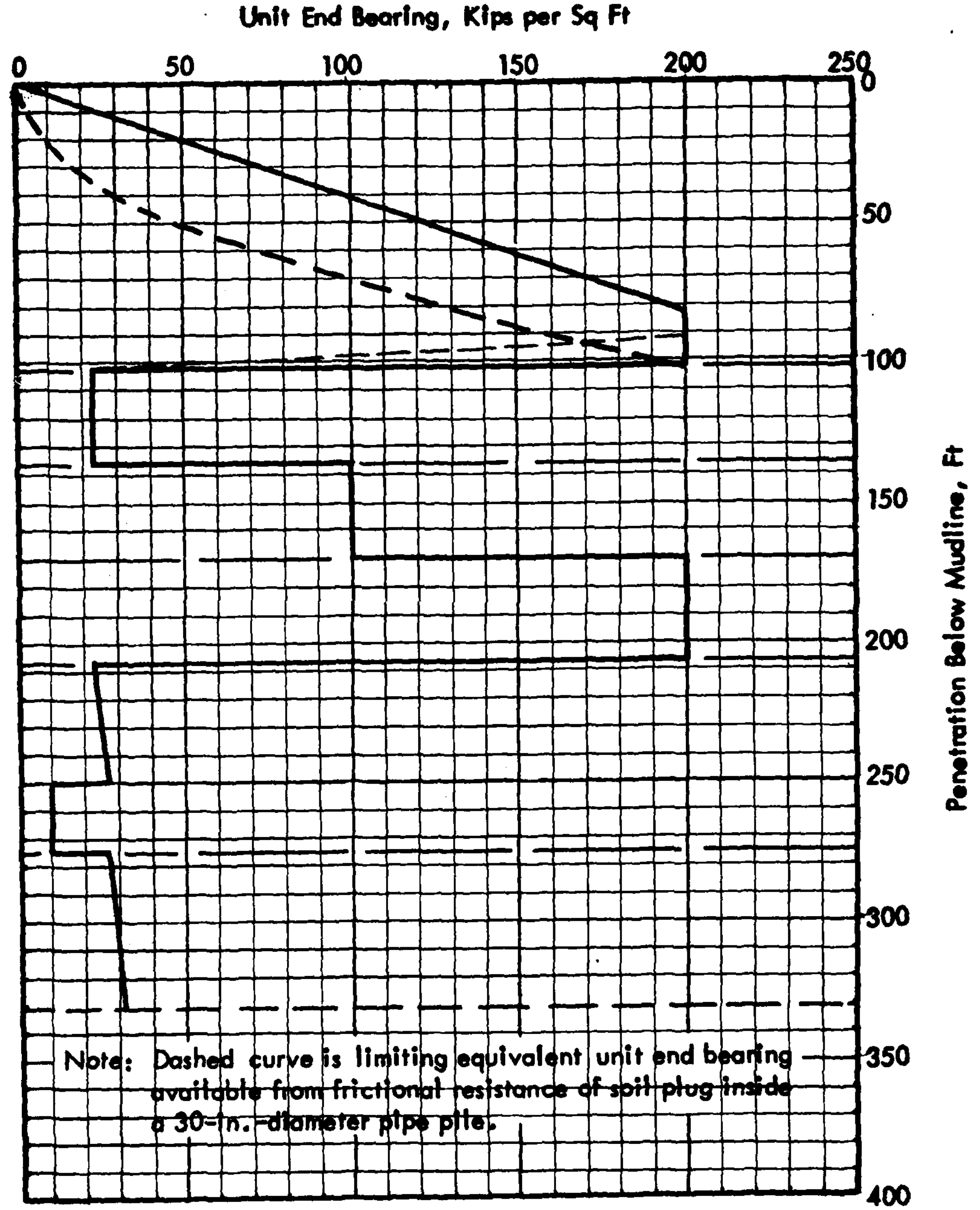
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



EQUIVALENT UNIT SKIN FRICTION

Boring #4

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-1-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



UNIT END BEARING

Boring #4

CREST OFFSHORE, INC.

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By S. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #4

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 25	0 0.40	–	25
25 50	0.85	–	25
50 82	1.44	–	32
82 102	1.85	–	20
102 128	0.85 1.00	–	26
128 136	1.00	–	8
136 170	1.70 1.70	–	34
170 207	2.00 2.00	–	37
207 250	1.80 2.10	–	43
250 275	1.00 1.00	–	25
275 330	2.25 2.65	–	55

Σ 330 FT

UNIT CAPACITY IN TENSION

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

— COMPRESSION — O.D. = 42"

(Boring #4) $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 25	0 0.6	0.3	25	82.5	0 82.5
25 50	0.6 1.2	0.9	25	247.4	329.9
50 82	1.2 2.0	1.6	32	563.0	892.9
82 102	2.0 2.0	2.0	20	439.8	1,332.7
102 128	1.0 1.0	1.0	26	285.9	1,618.6
128 136	1.0 1.0	1.0	8	88.0	1,706.6
136 170	1.7 1.7	1.7	34	635.6	2,342.2
170 207	2.0 2.0	2.0	37	813.7	3,155.9
207 250	1.8 2.1	1.95	43	922.0	4,077.9
250 275	1.0 1.0	1.0	25	274.9	4,352.8
275 330	2.25 2.65	2.45	55	1,481.7	5,834.5
			Σ 330		

CREST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

Boring #4

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	UNIT END BEARING	SEGMENT LENGTH
FT	KSF	KSF	FT
0 25	0 0.6	0 13.0	25
25 50	0.6 1.2	50.0	25
50 82	1.2 2.0	135.0	32
82 102	2.0 2.0	195.0	20
102 128	1.0 1.0	24.0	26
128 136	1.0 1.0	24.0	8
136 170	1.7 1.7	100.0 100.0	34
170 207	2.0 2.0	200.0 200.0	37
207 250	1.8 2.1	24.0 26.0	43
250 275	1.0 1.0	10.0 10.0	25
275 330	2.25 2.65	26.0 32.0	55

$\Sigma 330^{FT}$

UNIT CAPACITY IN COMPRESSION

CRUST OFFSHORE, INC.

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By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

END BEARING CAPACITY ($Q_p = q A_p$)

BORING #4

$A_p = 9.62$ SQ. FT

PENETRATION BELOW MUDLINE	UNIT END BEARING (q)	END BEARING (Q_p)
FT	KSF	KIPS
0 25	0 13.0	 125.1
25 50	 50.0	 481.0
50 82	 135.0	 1,298.7
82 102	 195.0	 1,875.9
102 128	24.0	230.9
128 136	 24.0	 230.9
136 170	100.0 100.0	962.0
170 207	200.0 200.0	1924.0
207 250	24.0 26.0	230.9 250.1
250 275	10.0 10.0	96.2
275 330	26.0 32.0	250.1 307.8

CRESTS OFFSHORE, INC.

Sheet 2.65 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN COMPRESSION (Boring #4)

PENETRATION BELOW MUDLINE	SKIN FRICTION	END BEARING	ULTIMATE CAPACITY	DESIGN CAPACITY
FT	KIPS	KIPS	KIPS	KIPS
0	0	0	0	0
25	82.5	125.1	207.6	138.4
25				
50	329.9	481.0	810.9	540.6
50				
82	892.9	1,298.7	2,191.6	1,461.1
82				
102	1,332.7	1,875.9	3,208.6	2,139.1
102		230.9	1,563.6	1,042.4
128	1,618.6		1,849.5	1,233.0
128				
136	1,706.6		1,937.5	1,291.7
136		962.0	2,668.6	1,779.1
170	2,342.2		3,304.2	2,202.8
170		1,924.0	4,266.2	2,844.1
207	3,155.9		5,079.9	3,386.6
207		230.9	3,386.8	2,257.9
250	4,077.9	250.1	4,328.0	2,885.3
250		96.2	4,174.1	2,782.7
275	4,352.8		4,449.0	2,966.0
275		250.1	4,602.9	3,068.6
330	5,834.5	307.8	6,142.3	4,094.9

CREST OFFSHORE, INC.

Sheet 2.66 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

— — TENSION — — $O.D. = 42''$

BORING #4 $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 25	0 0.40	0.20	25	55.0	0 55.0
25 50	0.40 0.85	0.62	25	170.4	225.4
50 82	0.85 1.44	1.14	32	401.1	626.5
82 102	1.44 1.85	1.64	20	360.7	987.2
102 128	0.85 1.00	0.92	26	263.0	1,250.2
128 136	1.00 1.00	1.00	8	88.0	1,338.2
136 170	1.70 1.70	1.70	34	635.6	1,973.8
170 207	2.00 2.00	2.00	37	813.7	2,787.5
207 250	1.80 2.10	1.95	43	922.0	3,709.5
250 275	1.00 1.00	1.00	25	274.9	3,984.4
275 330	2.25 2.65	2.45	55	1,481.7	5,466.1
			$\Sigma 330$		

CREST OFFSHORE, INC.

Sheet 2.67 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 22-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN TENSION (Boring #4)

PENETRATION BELOW MUDLINE	ULTIMATE CAPACITY	DESIGN CAPACITY (F.S.=1.5)
FT	KIPS	KIPS
0	0	0
25	55.0	36.7
25		
50	225.4	150.3
50		
82	626.5	417.7
82		
102	987.2	658.1
102		
128	1,250.2	833.5
128		
136	1,338.2	892.1
136		
170	1,973.8	1,315.9
170		
207	2,787.5	1,858.3
207		
250	3,709.5	2,473.0
250		
275	3,984.4	2,656.3
275		
330	5,466.1	3,644.1

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-3-76 Job No. 37-771-97 Calculation Pipe Pile Capacity Curves

Modification on Unit End Bearing Capacity

Boring #4

(i) At Penetration 91.5 FT (=102'-10.5')

End Bearing $Q_p = (170\ KSF) \times (9.62) = 1,635.4$ kips

Skin Friction $Q_s = 892.9 + 439.8 \times \frac{91.5-82}{20} = 1,101.8$ kips

Ultimate Capacity $Q = 1,635.4 + 1,101.8 = 2,737.2$ kips

Design Capacity $Q_d = 1,824.8$ kips

(ii) At Penetration 146.5 FT (=136'+10.5')

End Bearing $Q_p = (100\ KSF) \times (9.62) = 962$ kips

Skin Friction $Q_s = 1,706.6 + 635.6 \times \frac{10.5}{34} = 1,902.9$ KIPS

Ultimate Capacity $Q = 962 + 1,902.9 = 2,864.9$ kips

Design Capacity $Q_d = 1,910$ kips

(iii) At Penetration 180.5 FT (=170'+10.5')

End Bearing $Q_p = (200\ KSF) \times (9.62) = 1,924$ kips

Skin Friction $Q_s = 2,342.2 + 813.7 \times \frac{10.5}{37} = 2,573.1$ KIPS

Ultimate Capacity $Q = 1,924 + 2,573.1 = 4,497.1$ kips

Design Capacity $Q_d = 2,998.1$ kips

CREST OFFSHORE, INC. Sheet 2.69 of 78

By C. Chein Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

BORING #4

(iv) At Penetration 196.5 FT (= 207' - 10.5')

End Bearing $Q_p = (200 \text{ KSF}) \times (9.62) = 1{,}924$ KIPS

Skin Friction $Q_s = 2{,}342.2 + 813.7 \times \frac{196.5-170}{37} = 2{,}925^{\text{KIPS}}$

Ultimate Capacity $Q = 1{,}924 + 2{,}925 = 4{,}849$ KIPS

Design Capacity $Q_d = 3{,}232.7$ KIPS

(v) At Penetration 239.5 FT (= 250' - 10.5')

End Bearing $Q_p = (25.5 \text{ KSF}) \times (9.62) = 245.3$ KIPS

Skin Friction $Q_s = 3{,}155.9 + 922 \times \frac{239.5-207}{43} = 3{,}852.8^{\text{KIPS}}$

Ultimate Capacity $Q = 245.3 + 3{,}852.8 = 4{,}098.1$ KIPS

Design Capacity $Q_d = 2{,}732.1$ KIPS

(vi) At Penetration 285.5 FT (= 275' + 10.5')

End Bearing $Q_p = (27 \text{ KSF}) \times (9.62) = 259.7$ KIPS

Skin Friction $Q_s = 4{,}352.8 + 1{,}481.7 \times \frac{10.5}{55} = 4{,}635.7$ KIPS

Ultimate Capacity $Q = 259.7 + 4{,}635.7 = 4{,}895.4$ KIPS

Design Capacity $Q_d = 3{,}263.6$ KIPS

CREST OFFSHORE, INC.

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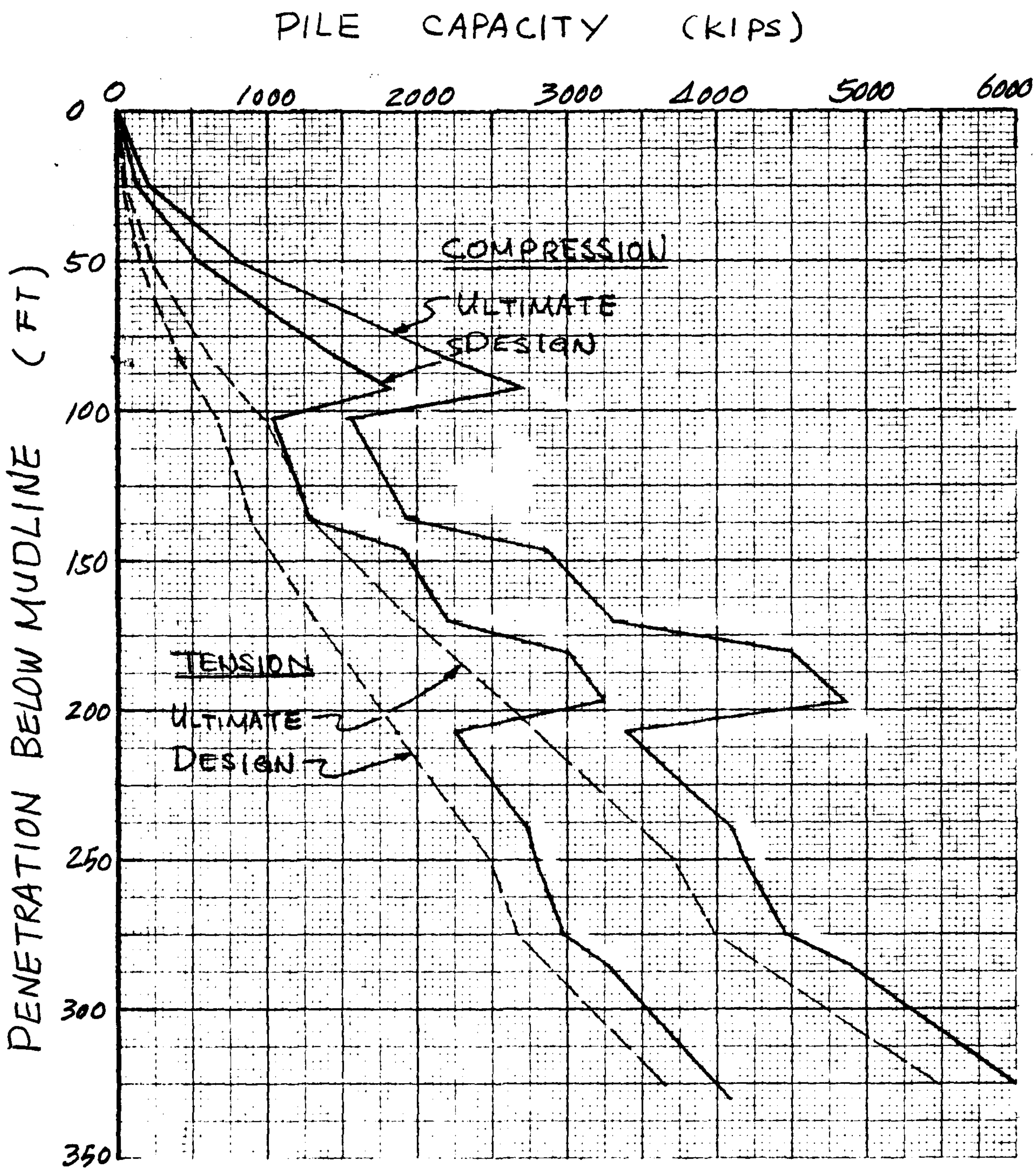
By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



42-IN. DIAMETER PIPE PILES

(Boring #4)

CREST OFFSHORE, INC.

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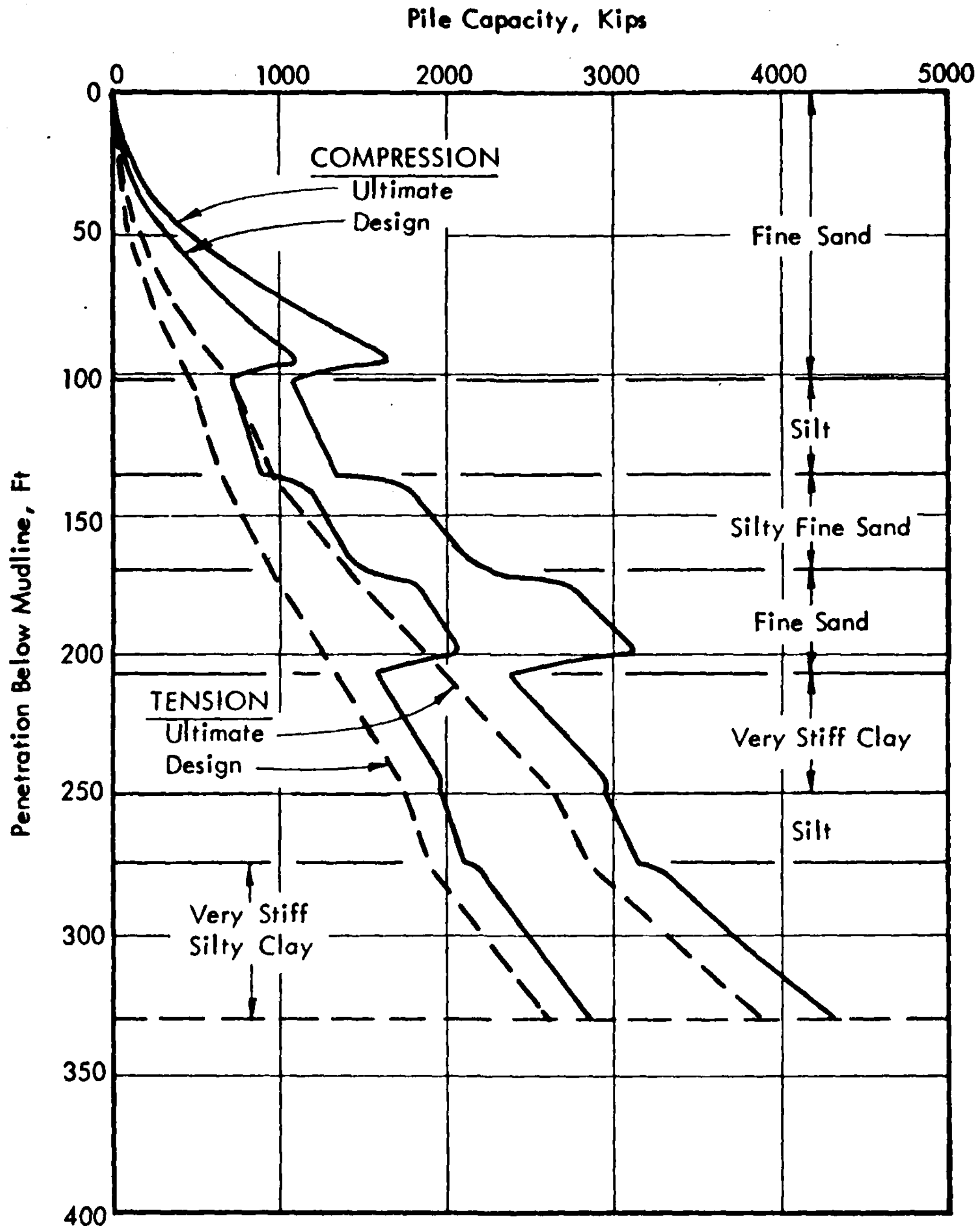
By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-3-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



PILE CAPACITY CURVES
30-in. Diameter Pipe Piles
Boring 4

2.6 CAPACITY CURVES FOR BORING SITE NO. 4 WITH 33" DIAMETER INSERTED PILING

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-721-97 Calculation Pipe Pile Capacity Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

— — COMPRESSION — —

(Boring #4)

O.D. = 42"

$A_s = \pi D_{42} (\Delta l) = 10.996 (\Delta l)$ SQ.FT

O.D. = 33"

$A_s' = \pi D_{33} (\Delta l)$
$= 8.639 (\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 25	0 0.6	0.3	25	82.5	0 82.5
25 50	0.6 1.2	0.9	25	247.4	329.9
50 82	1.2 2.0	1.6	32	563.0	892.9
82 102	2.0 2.0	2.0	20	439.8	1,332.7
102 128	1.0 1.0	1.0	26	285.9	1,618.6
128 136	1.0 1.0	1.0	8	88.0	1,706.6
136 170	1.7 1.7	1.7	34	635.6	2,342.2
170 207	2.0 2.0	2.0	37	813.7	3,155.9
207 250	1.8 2.1	1.95	43	724.4* ~~922.0~~	3,880.3 ~~4,077.9~~
250 275	1.0 1.0	1.0	25	216.0* ~~274.9~~	4,096.3 ~~4,352.8~~
275 330	2.25 2.65	2.45	55	1,164.1* ~~1,481.7~~	5,260.4 ~~5,834.5~~
			Σ 330		

* denotes the contribution from 33"φ inserted piling.

END BEARING CAPACITY $Q_p = q A_p$ BORING #4

$A_p = 9.62$ SQ. FT for 42"ϕ piling

$A_p = 5.94$ SQ. FT for 33"ϕ piling

PENETRATION BELOW MUDLINE	UNIT END BEARING (q)	END BEARING (Q_p)
FT	KSF	KIPS
0 25	0 13.0	125.1
25 50	50.0	481.0
50 82	135.0	1,298.7
82 102	195.0	1,875.9
102 128	24.0	230.9
128 136	24.0	230.9
136 170	100.0 100.0	962.0
170 207	200.0 200.0	1924.0
207 250	24.0 26.0	142.6* 154.4*
250 275	10.0 10.0	59.4*
275 330	26.0 32.0	154.4* 190.1*

* denotes the contribution from 33"ϕ inserted piling

CREST OFFSHORE, INC.

Sheet 2.75 of 78

By C. Chern Client U. S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

PILE CAPACITY IN COMPRESSION (Boring #4 -- 33'ϕ Inserted Piling)

PENETRATION BELOW MUDLINE	SKIN FRICTION	END BEARING	ULTIMATE CAPACITY	DESIGN CAPACITY
FT	KIPS	KIPS	KIPS	KIPS
0 25	0 82.5	0 125.1	0 207.6	0 138.4
25 50	329.9	481.0	810.9	540.6
50 82	892.9	1,298.7	2,191.6	1,461.1
82 102	1,332.7	1,875.9	3,208.6	2,139.1
102 128	1,618.6	230.9	1,563.6 1,849.5	1,042.4 1,233.0
128 136	1,706.6		1,937.5	1,291.7
136 170	2,342.2	962.0	2,668.6 3,304.2	1,779.1 2,202.8
170 207	3,155.9	1,924.0	4,266.2 5,079.9	2,844.1 3,386.6
207 250	3,880.3	142.6 154.4	3,298.5 4,034.7	2,199.0 2,689.8
250 275	4,096.3	59.4	3,939.7 4,155.7	2,626.5 2,770.5
275 330	5,260.4	154.4 190.1	4,250.7 5,450.5	2,833.8 3,633.7

CREST OFFSHORE, INC.

Sheet 2.76 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

SKIN FRICTION CAPACITY $(Q_s = f_{as} A_s)$

$\left\{ \begin{array}{l} O.D. = 33'' \\ A_s' = \pi D_{33} (\Delta l) \\ \quad = 8.639 (\Delta l) \text{ SQ.FT} \end{array} \right.$

-- TENSION -- O.D. = 42"

BORING #4 $A_s = \pi D_{42} (\Delta l) = 10.996 (\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 25	0 0.40	0.20	25	55.0	0 55.0
25 50	0.40 0.85	0.62	25	170.4	225.4
50 82	0.85 1.44	1.14	32	401.1	626.5
82 102	1.44 1.85	1.64	20	360.7	987.2
102 128	0.25 1.00	0.92	26	263.0	1,250.2
128 136	1.00 1.00	1.00	8	88.0	1,338.2
136 170	1.70 1.70	1.70	34	635.6	1,973.8
170 207	2.00 2.00	2.00	37	813.7	2,787.5
207 250	1.80 2.10	1.95	43	724.4* ~~922.0~~	3,511.9 ~~[illegible]~~
250 275	1.00 1.00	1.00	25	216.0* ~~274.9~~	3,727.9 ~~[illegible]~~
275 330	2.25 2.65	2.45	55	1,164.1* ~~1,481.7~~	4,892.0 ~~5,406.~~
			Σ 330		

* denotes the contribution from 33"ϕ inserted piling

CREST OFFSHORE, INC. Sheet 2.77 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

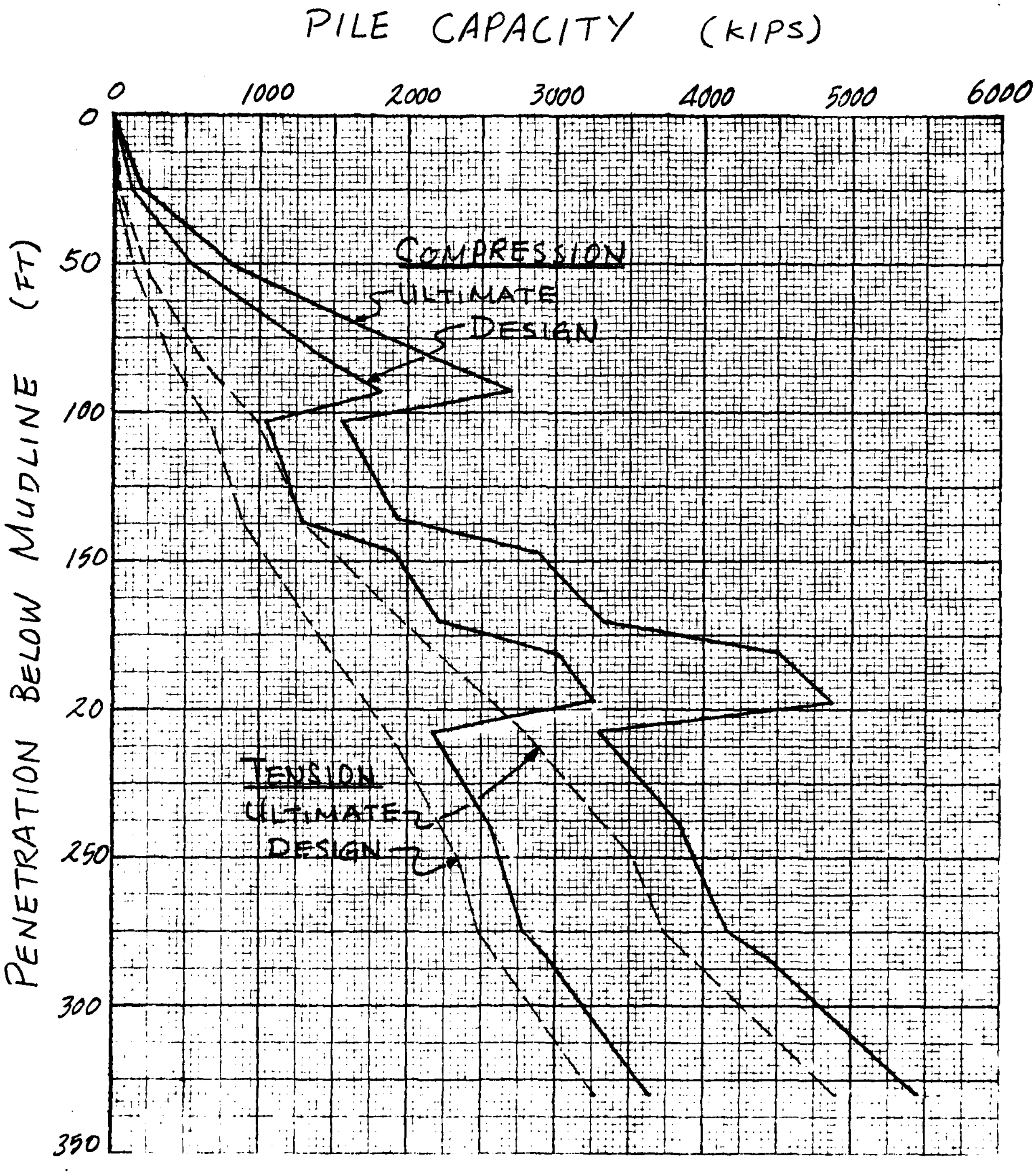
PILE CAPACITY IN TENSION (Boring #4)

PENETRATION BELOW MUDLINE	ULTIMATE CAPACITY	DESIGN CAPACITY (F.S.=1.5)
FT	KIPS	KIPS
0 25	0 55.0	0 36.7
25 50	225.4	150.3
50 82	626.5	417.7
82 102	987.2	658.1
102 128	1,250.2	833.5
128 136	1,338.2	892.1
136 170	1,973.8	1,315.9
170 207	2,787.5	1,858.3
207 250	3,511.9 ~~3,709.5~~	2,341.3 ~~2,473.0~~
250 275	3,727.9 ~~3,954.4~~	2,485.3 ~~2,636.3~~
275 330	4,892.0 ~~5,466.1~~	3,261.3 ~~3,644.1~~

CREST OFFSHORE, INC.

Sheet 2.78 of 78

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-26-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves



42-IN. DIAMETER PIPE PILES
(200 FT PENETRATION)
W/ 33-IN DIAMETER INSERTED PILES

(Boring #4)

SECTION 3

PILE DRIVING RESISTANCE CURVES

3.1 INTRODUCTION

Driving resistance curves are developed for 42-inch diameter pipe piles at boring site Nos. 1, 2, 3A and 4, respectively. The method used in this section is the stress-wave approach as presented in the McClelland Report. It should be noted that these curves are empirical and approximate in nature and in no way assure attainment of the desired penetration.

3.2 ESTIMATED DRIVING RESISTANCE CURVES

CREST OFFSHORE, INC.

Sheet 3-93 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-16-76 Job No. 27-771-91 Calculation Pile Driving Resistance Curves

Skin Friction Capacity ($Q_s = f_{as} A_s$) *50% SKIN FRICTION IN CLAY

--- Compression ---

(Boring #1)

O.D. = 42"

$A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

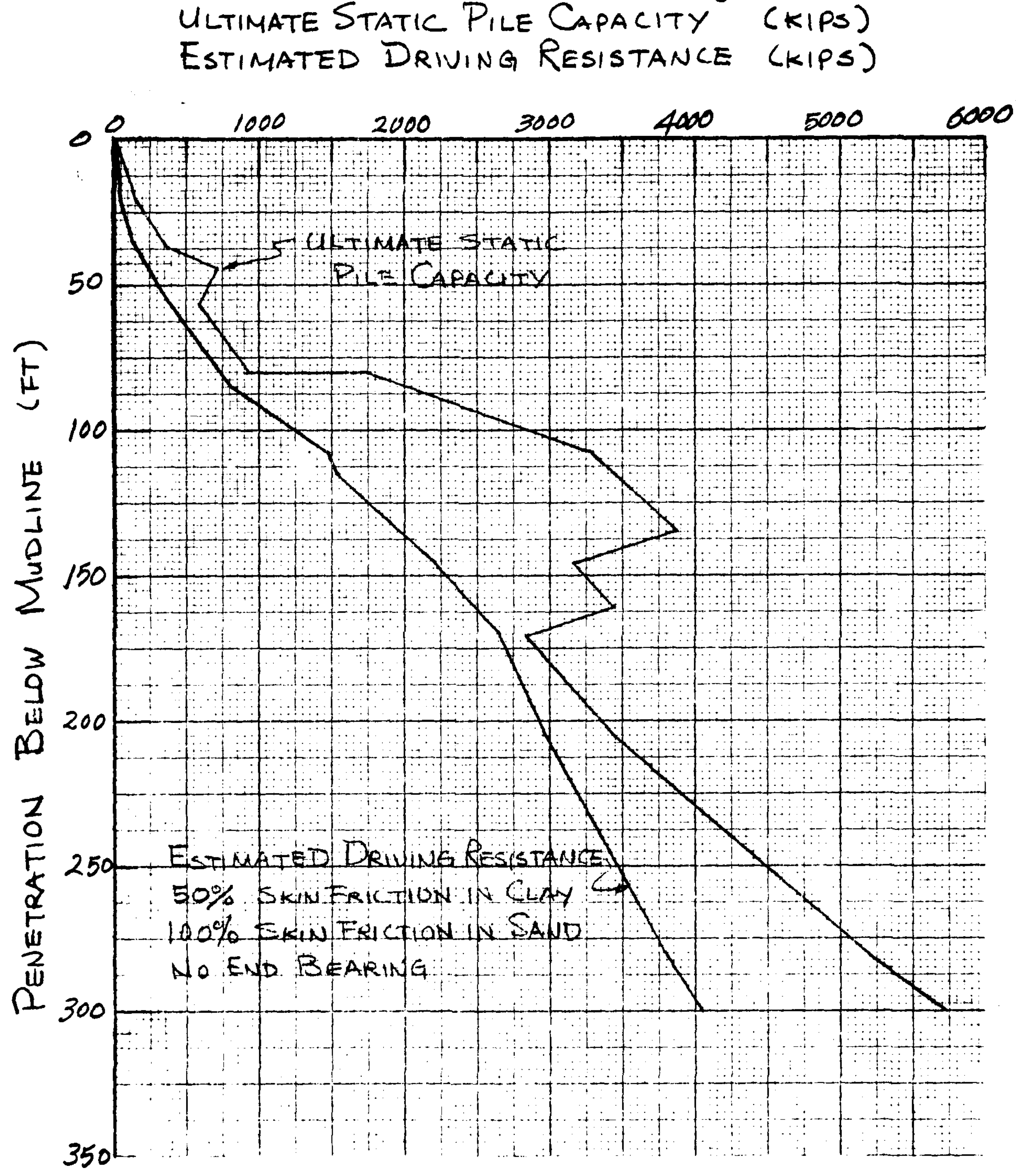
Penetration Below Mudline (ft)	Unit Skin Friction (ksf)	Ave. Unit Skin Friction f_{as} (ksf)	Segment Length (Δl) (FT)	Skin Friction in Segment (kips)	Total Skin Friction (kips)
0 20	0 0.45	0.225	20	49.5	0 49.5
20 35	0.40 0.67	0.535	15	88.2	137.7
35 56	0.85 1.30	1.075	21	248.2	385.9
56 79	1.10 1.65	1.375	23	347.7	733.6
79 82	1.90 2.00	1.950	3	64.3	797.9
82 107	2.00 2.00	2.00	25	549.8	1,347.7
107 115	2.00 2.00	2.00	8	175.9	1,523.6
115 145	2.00 2.00	2.00	30	659.8	2,183.4
145 170	1.70 1.70	1.70	25	467.3	2,650.7
170 205	1.48 1.72	1.60	35	307.9* ~~615.8~~	2,958.6 ~~3,266.5~~
205 280	1.72 2.30	2.01	75	828.8* ~~1,657.6~~	3,787.4 ~~4,924.1~~
280 300	2.30 2.40	2.35	20	258.4* ~~516.8~~	4,045.8 ~~5,440.9~~
			$\Sigma = 300^{ft}$		

CREST OFFSHORE, INC.

Sheet 324 of 66

By C. Chen Client U.S. NAVY Subject Foundation Analysis

Date 6-11-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



(Boring #1)

42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$) *50% SKIN FRICTION IN CLAY

-- COMPRESSION -- O.D. = 42"

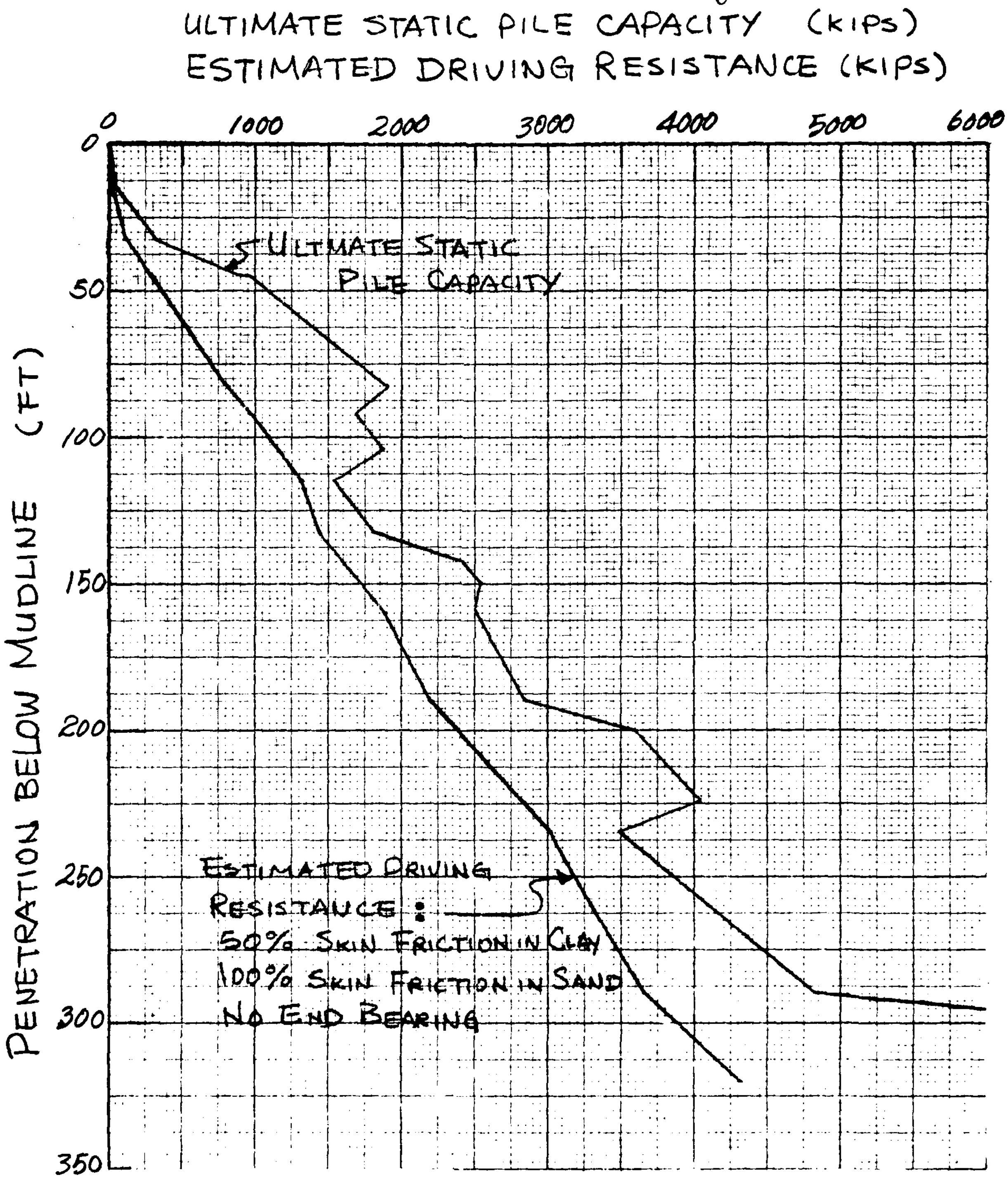
(Boring #2) $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 15	0 0.30	0.15	15	24.7	0 24.7
15 33	0.30 0.70	0.50	18	99.0	123.7
33 40	2.15 2.27	2.21	7	85.0* ~~170.1~~	208.7 ~~293.8~~
40 45	2.27 2.40	2.33	5	64.0* ~~128.1~~	272.7 ~~421.9~~
45 82	0.90 1.70	1.30	37	528.9	801.6 ~~950.8~~
82 91	1.70 1.70	1.70	9	168.2	969.8 ~~1,119.0~~
91 114	1.40 1.40	1.40	23	354.1	1,323.9 ~~1,473.1~~
114 132	0.90 0.90	0.90	18	89.0* ~~178.1~~	1,412.9 ~~1,651.2~~
132 160	1.40 1.40	1.40	28	431.0	1,843.9 ~~2,082.2~~
160 190	1.00 1.00	1.00	30	329.9	2,173.8 ~~2,412.1~~
190 235	1.62 1.70	1.66	45	821.4	2,995.2 ~~3,233.5~~
235 270	1.80 2.20	2.00	35	384.9* ~~769.7~~	3,380.1 ~~4,003.2~~
270 290	2.20 2.35	2.27	20	249.6* ~~499.2~~	3,629.7 ~~4,502.4~~
290 320	2.00 2.00	2.00	30	659.8	4,289.5 ~~5,162.2~~

CREST OFFSHORE, INC.

Sheet 3-06 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



(Boring #2)

42-IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3-07 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-77L-97 Calculation Pile Driving Resistance Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$) *50% SKIN FRICTION IN CLAY

-- COMPRESSION -- O.D. = 42"

(Boring #3A) $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 20	0. 0.5	0.25	20	55.0	0 55.0
20 35	0.5 0.85	0.67	15	110.5	165.5
35 55	0.85 1.30	1.07	20	235.3	400.8
55 65	1.10 1.30	1.20	10	131.9	532.7
65 75	1.30 1.50	1.40	10	153.9	686.6
75 82	1.80 2.00	1.90	7	146.2	832.8
82 106	2.00 2.00	2.00	24	527.8	1,360.6
106 115	2.00 2.00	2.00	9	197.9	1,558.5
115 125	2.00 2.00	2.00	10	219.9	1,778.4
125 175	1.70 1.70	1.7	50	934.7	2,713.1
175 195	1.00 1.00	1.0	20	219.9	2,933.0
195 235	1.53 1.57	1.55	40	340.9* ~~681.8~~	3,273.9 ~~3,614.8~~
235 255	1.70 1.70	1.70	20	373.9	3,647.8 ~~3,988.7~~
255 265	2.63 2.63	2.63	10	144.6* ~~289.2~~	3,792.4 ~~4,277.9~~
265 275	2.20 2.20	2.20	10	120.9* ~~241.9~~	3,913.3 ~~4,519.8~~
275 290	1.70 1.70	1.70	15	280.4	4,193.7 ~~4,800.2~~
290 305	2.45 2.40	2.42	15	199.6* ~~399.2~~	4,393.3 ~~5,199.4~~
305 370	1.70 1.70	1.70	65	1,215.1	5,608.4 ~~6,414.5~~
			Σ370		

CREST OFFSHORE, INC.

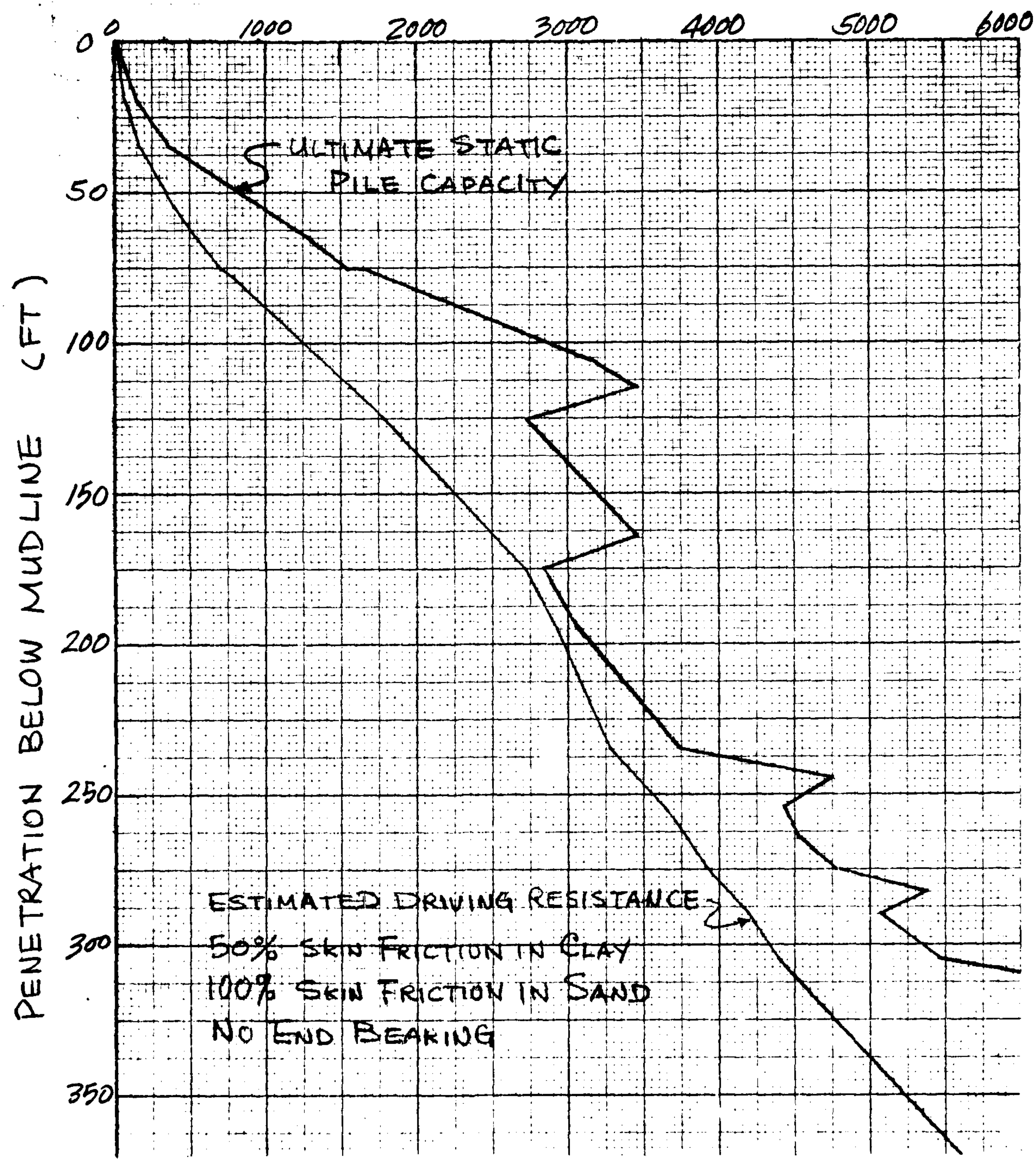
Sheet 3-23 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-4-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)

ESTIMATED DRIVING RESISTANCE (KIPS)



(Boring #3A)

42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-77L-97 Calculation Pile Driving Resistance Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$) *50% SKIN FRICTION IN CLAY

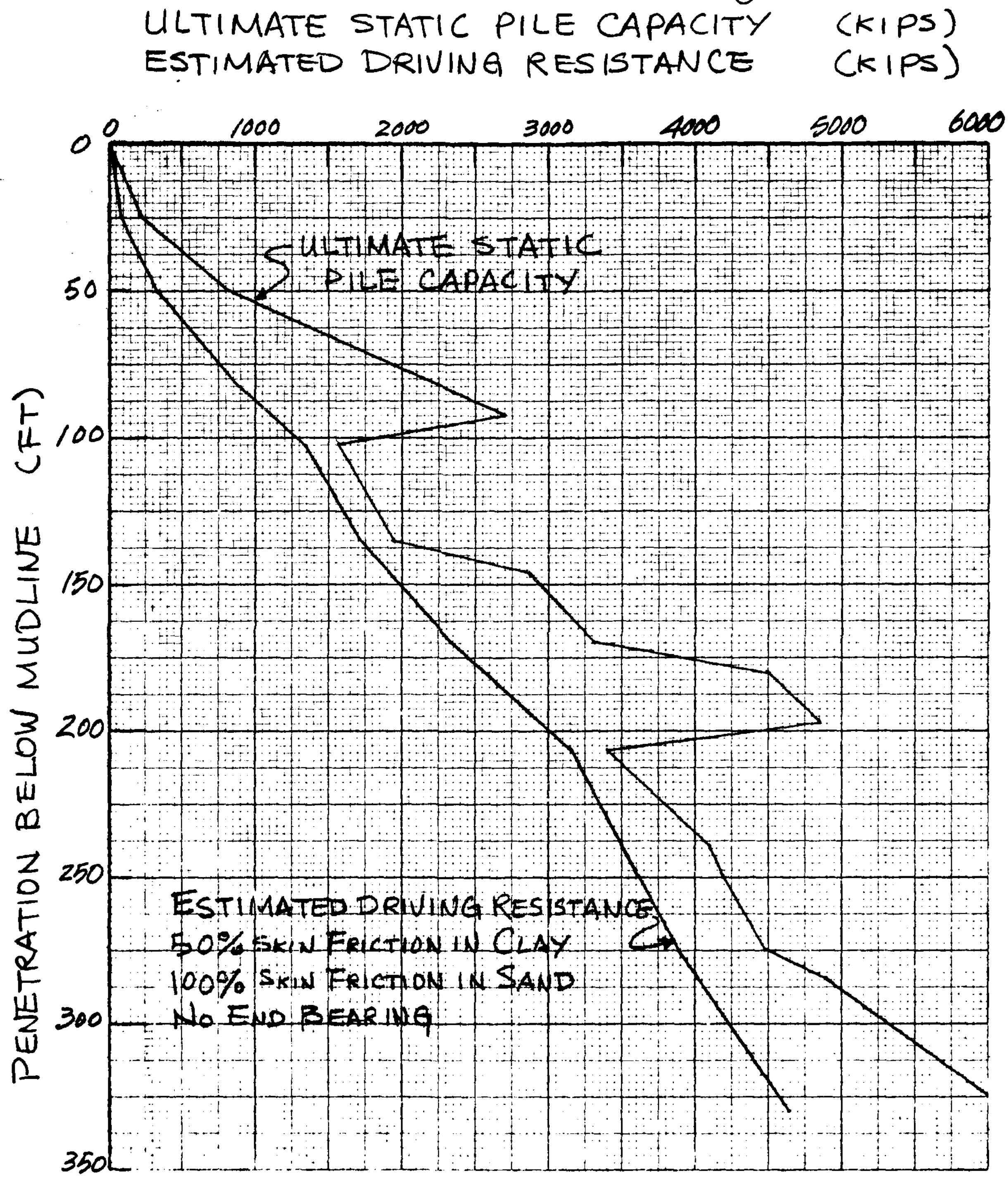
—— COMPRESSION —— O.D. = 42"

(Boring #4) $A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 25	0 0.6	0.3	25	82.5	0 82.5
25 50	0.6 1.2	0.9	25	247.4	329.9
50 82	1.2 2.0	1.6	32	563.0	892.9
82 102	2.0 2.0	2.0	20	439.8	1,332.7
102 128	1.0 1.0	1.0	26	285.9	1,618.6
128 136	1.0 1.0	1.0	8	88.0	1,706.6
136 170	1.7 1.7	1.7	34	635.6	2,342.2
170 207	2.0 2.0	2.0	37	813.7	3,155.9
207 250	1.8 2.1	1.95	43	461.0* ~~922.0~~	3,616.9 ~~4,077.9~~
250 275	1.0 1.0	1.0	25	274.9	3,891.8 ~~4,352.8~~
275 330	2.25 2.65	2.45	55	740.8* ~~1,481.7~~	4,632.6 ~~5,834.5~~
			Σ330		

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

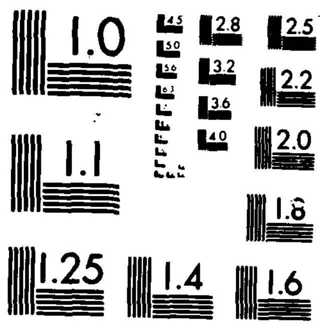


(Boring #4)

42-IN. DIAMETER PIPE PILES

AD-A163 522 FOUNDATION ANALYSIS EAST COAST AIR COMBAT MANEUVERING RANGE OFFSHORE KITT..(U) CREST ENGINEERING INC TULSA OK SEP 76 27-771-97 CHES/NAVFAC-FPO-7612 N62477-76-C-0179 2/6

UNCLASSIFIED F/G 13/13 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

CREST OFFSHORE, INC.

Sheet 3-JL of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

SKIN FRICTION CAPACITY ($Q_s = f_{as} A_s$)

33"Φ Inserted piling

— COMPRESSION —

O.D. = 42"

(Boring #4)

$A_s = \pi D(\Delta l) = 10.996(\Delta l)$ SQ.FT

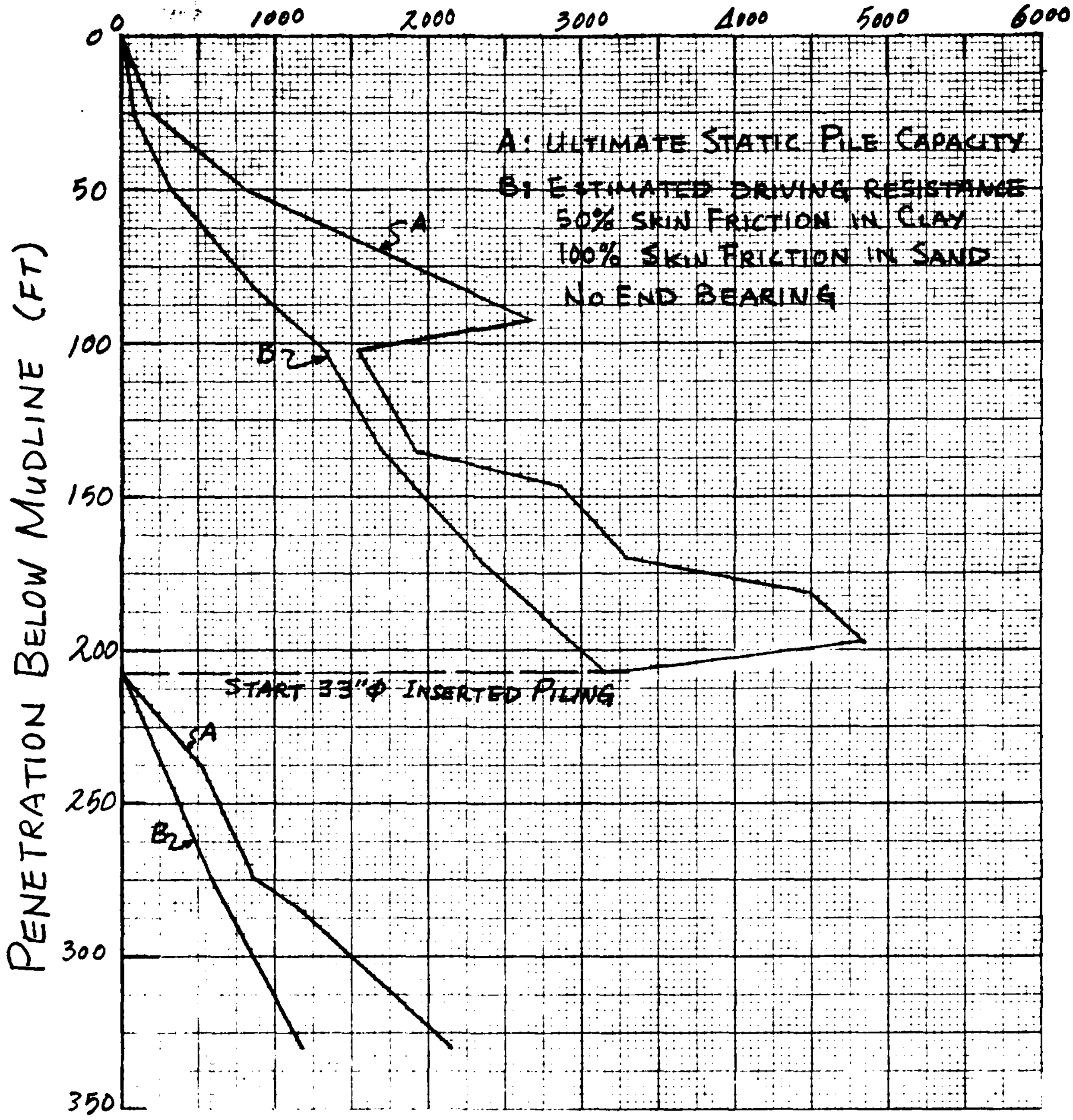
PENETRATION BELOW MUDLINE	UNIT SKIN FRICTION	AVE. UNIT SKIN FRICTION (f_{as})	SEGMENT LENGTH (Δl)	SKIN FRICTION IN SEGMENT (Q_s)	TOTAL SKIN FRICTION
FT	KSF	KSF	FT	KIPS	KIPS
0 25	0 0.6	0.3	25	82.5	0 82.5
25 50	0.6 1.2	0.9	25	247.4	329.9
50 82	1.2 2.0	1.6	32	563.0	892.9
82 102	2.0 2.0	2.0	20	439.8	1,332.7
102 128	1.0 1.0	1.0	26	285.9	1,618.6
128 136	1.0 1.0	1.0	8	88.0	1,706.6
136 170	1.7 1.7	1.7	34	635.6	2,342.2
170 207	2.0 2.0	2.0	37	813.7	3,155.9
207 250	1.8 2.1	1.95	43	362.2* ~~922.0~~	0 362.2 ~~4,077.9~~
250 275	1.0 1.0	1.0	25	216.0 ~~274.9~~	578.2 ~~4,352.8~~
275 330	2.25 2.65	2.45	55	582.0* ~~1,481.7~~	1,160.2 ~~5,834.5~~
			Σ330		

CREST OFFSHORE, INC.

Sheet 3-12 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-26-76 Job No. 27-771-97 Calculation Pipe Pile Capacity Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



42-IN. DIAMETER PIPE PILES (200 FT PENETRATION)

33-IN. DIAMETER INSERTED PILES

(Boring #4)

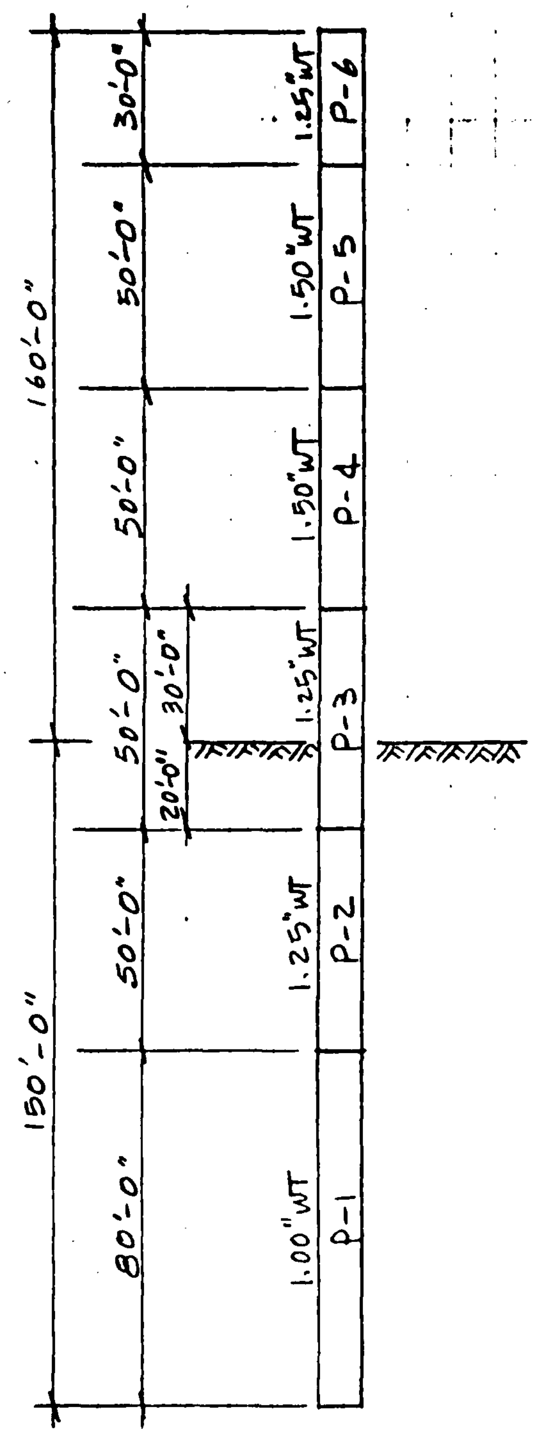
3.3 PILE SCHEDULE NO. 1 -- 1 IN. MINIMUM WALL THICKNESS

CREST OFFSHORE, INC.

Sheet 3-14 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-2-76 Job No. 27-77L-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

150 FT Penetration

Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

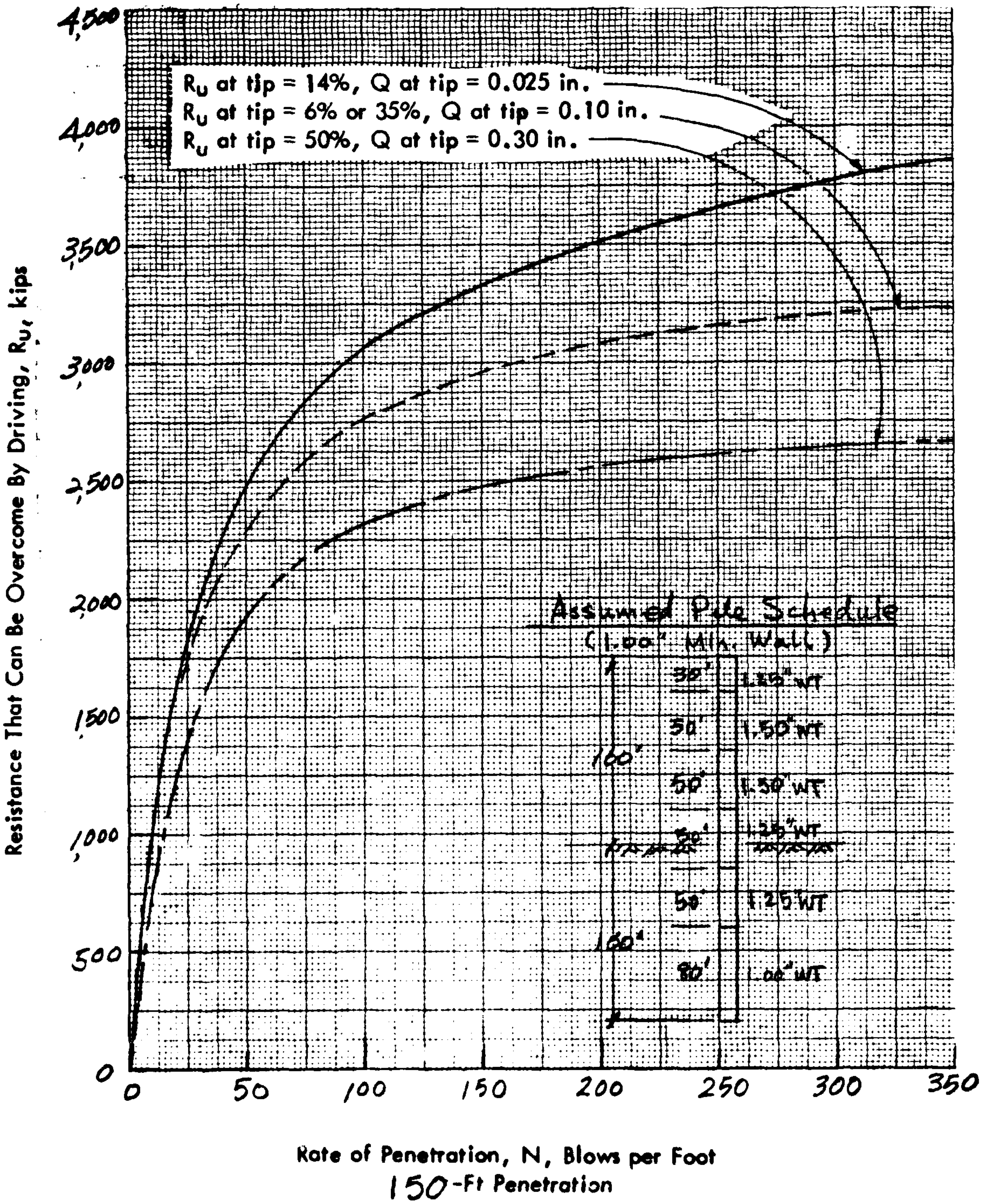
Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3-15 of 66

By C. Cherr Client U.S. NAVY Subject Foundation Analysis

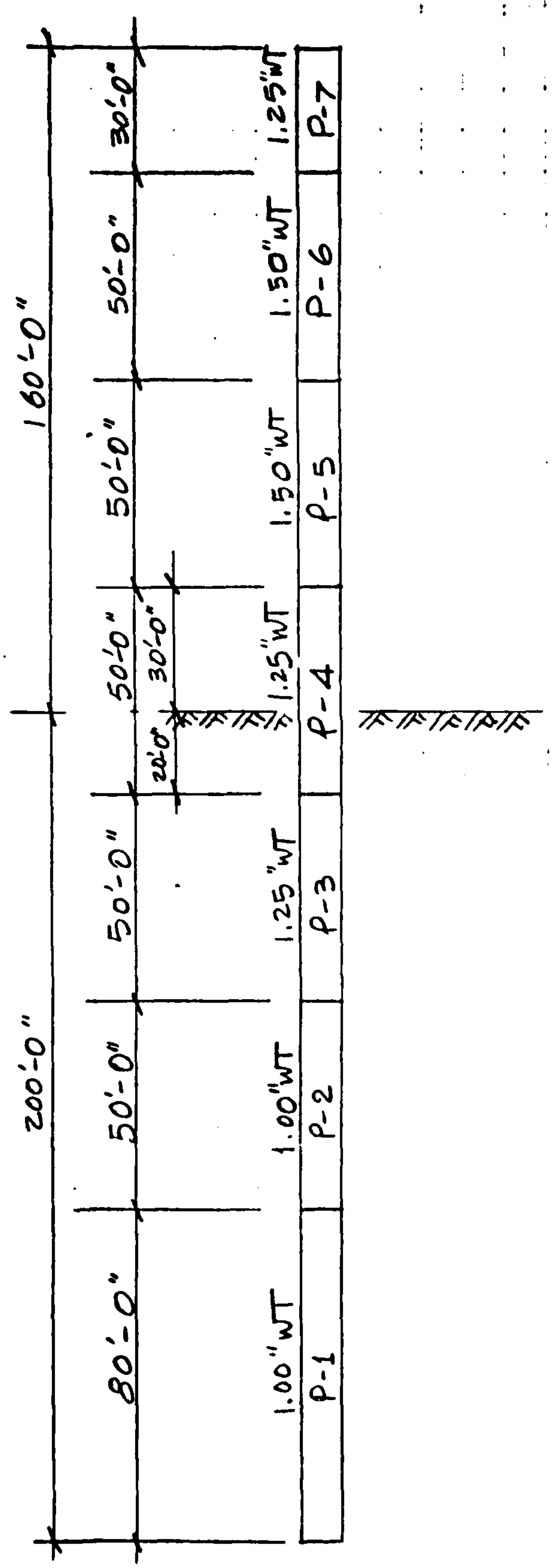
Date 6-9-76 Job No. 27-271-97 Calculation Pile Driving Resistance Curves



42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC. Sheet 3-16 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-2-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

200 FT Penetration

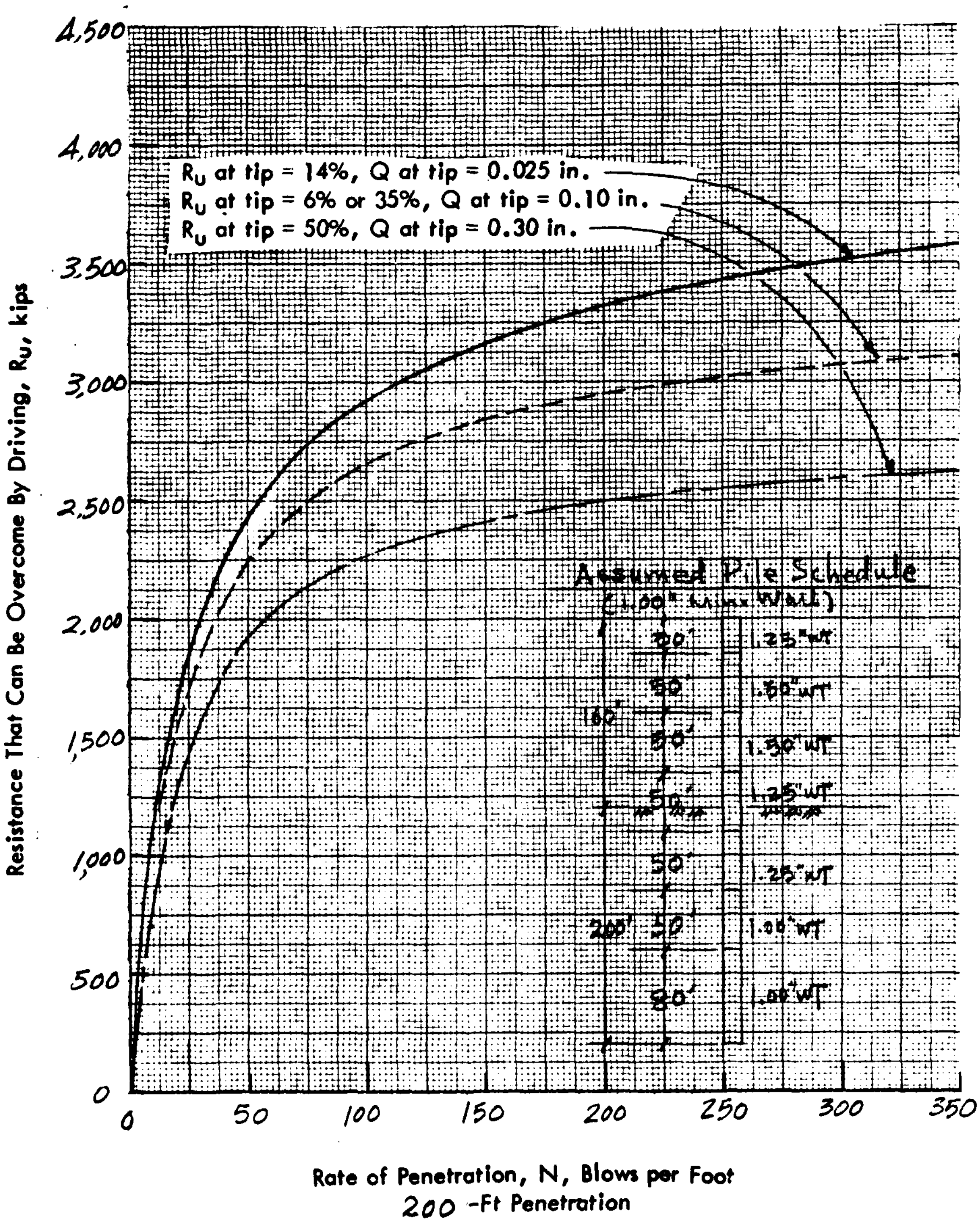
Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3-17 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-9-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



42-IN DIAMETER PIPE PILES

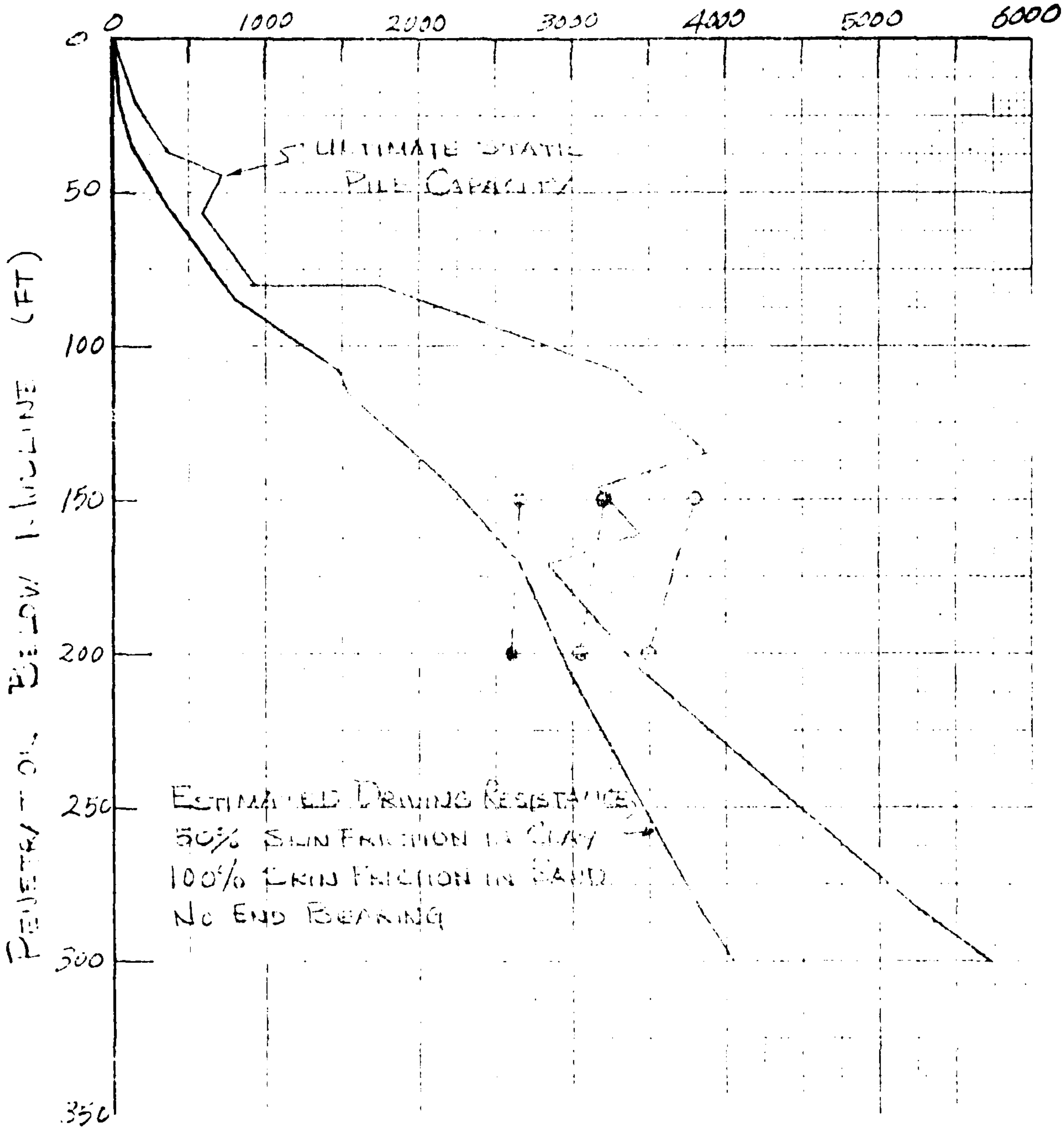
CREST OFFSHORE, INC.

Sheet 3-18 of 66

By C. Chin Client U.S. Navy Subject Foundation Analysis

Date 6-11-76 Job No 27 ... 97 Calculation ... Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



1.00" WT Min.
Vulcan 560 Hammer

(Boring #1)

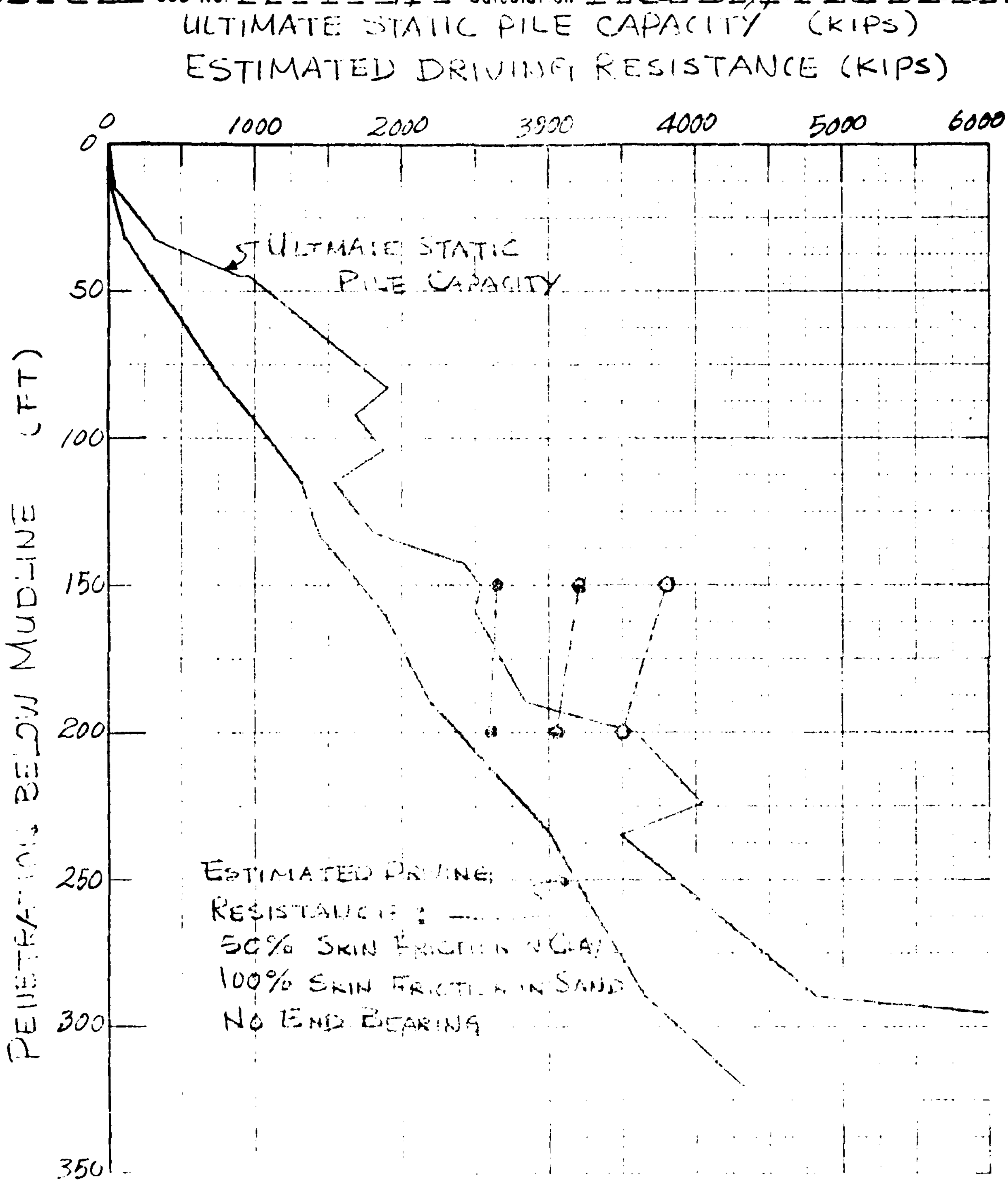
42-in DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3-19 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-4-76 Job No. 27-771-91 Calculation Pile Driving Resistance Curves



1.00" WT Min.

Vulcan 560 H

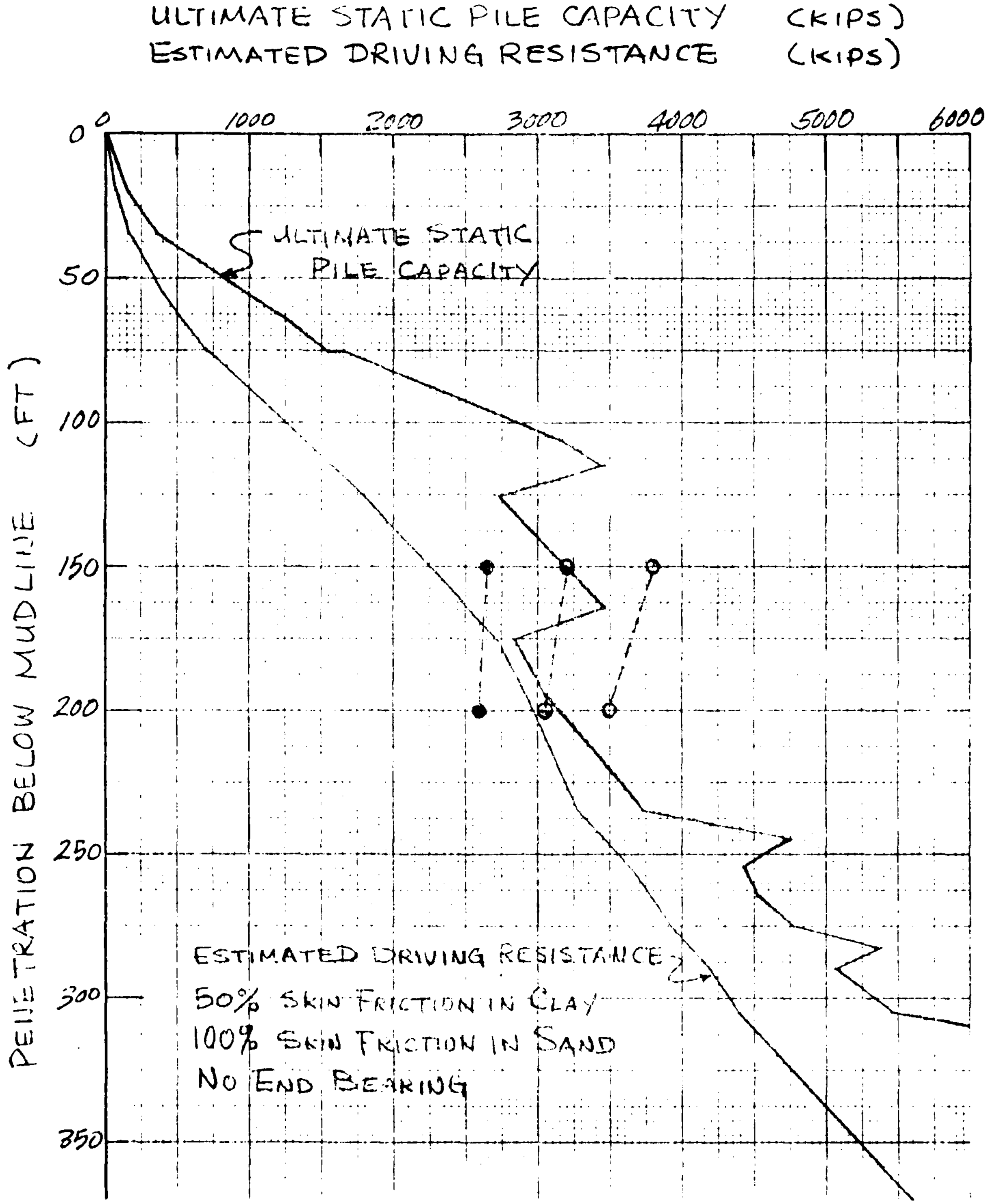
(Boring #2)

42-IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.20 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-91 Calculation Pile Driving Resistance Curves



1.00" WT Min.

(Boring #3A)

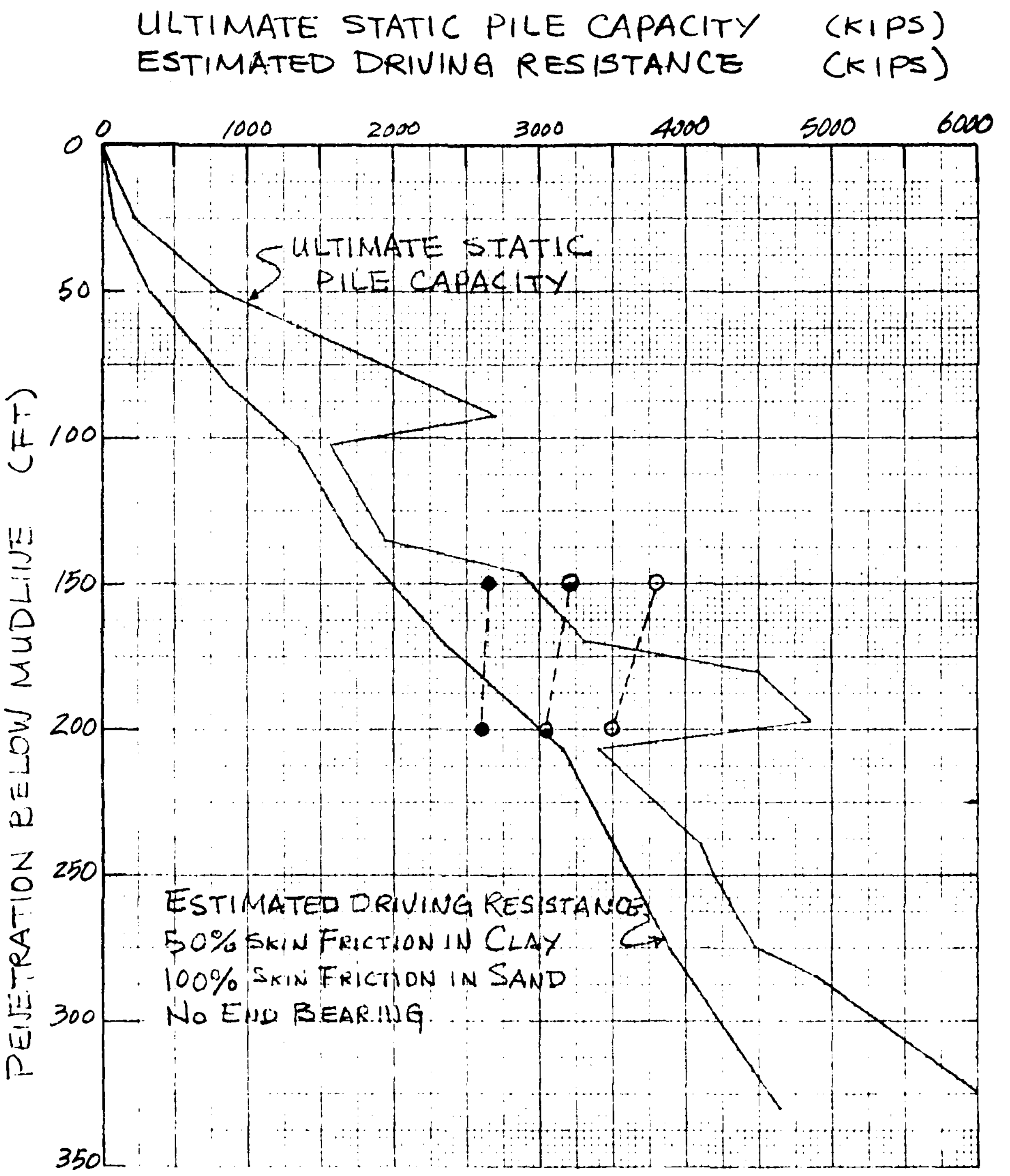
Vulcon 560 Hammer

42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3-21 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



1.00" WT Min.
Vulcan 560 Hammer

(Boring #4)

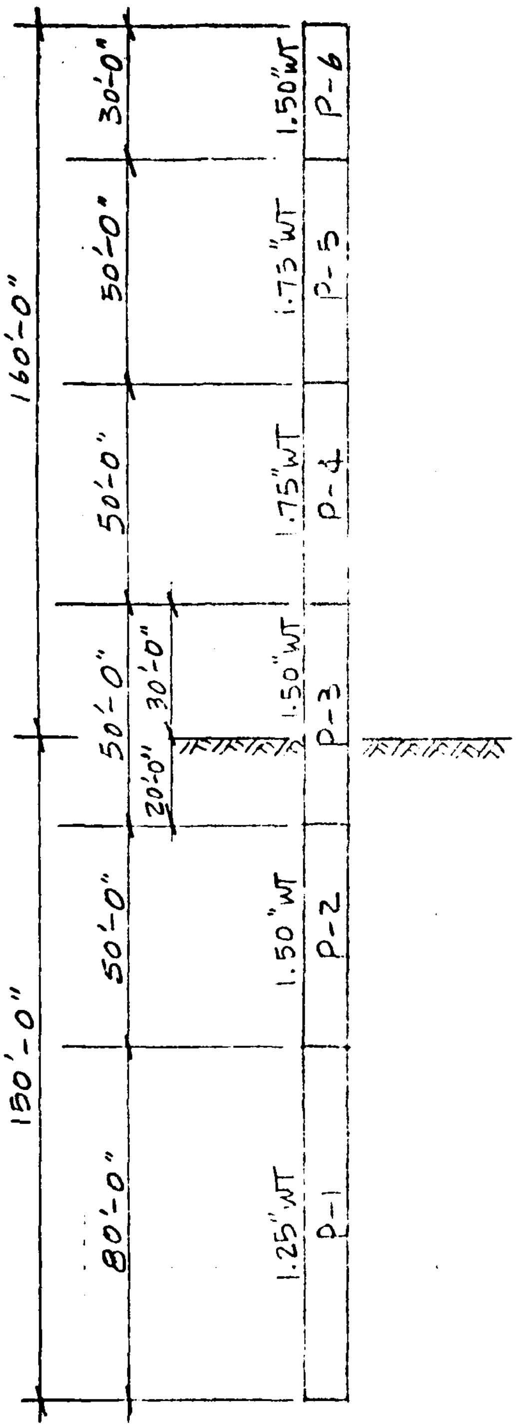
42-IN. DIAMETER PIPE PILES

3.4 PILE SCHEDULE NO. 2 -- 1.25 IN. MINIMUM WALL THICKNESS

CREST OFFSHORE, INC.

Sheet 3-23 of 66

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-8-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

150 FT Penetration

Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

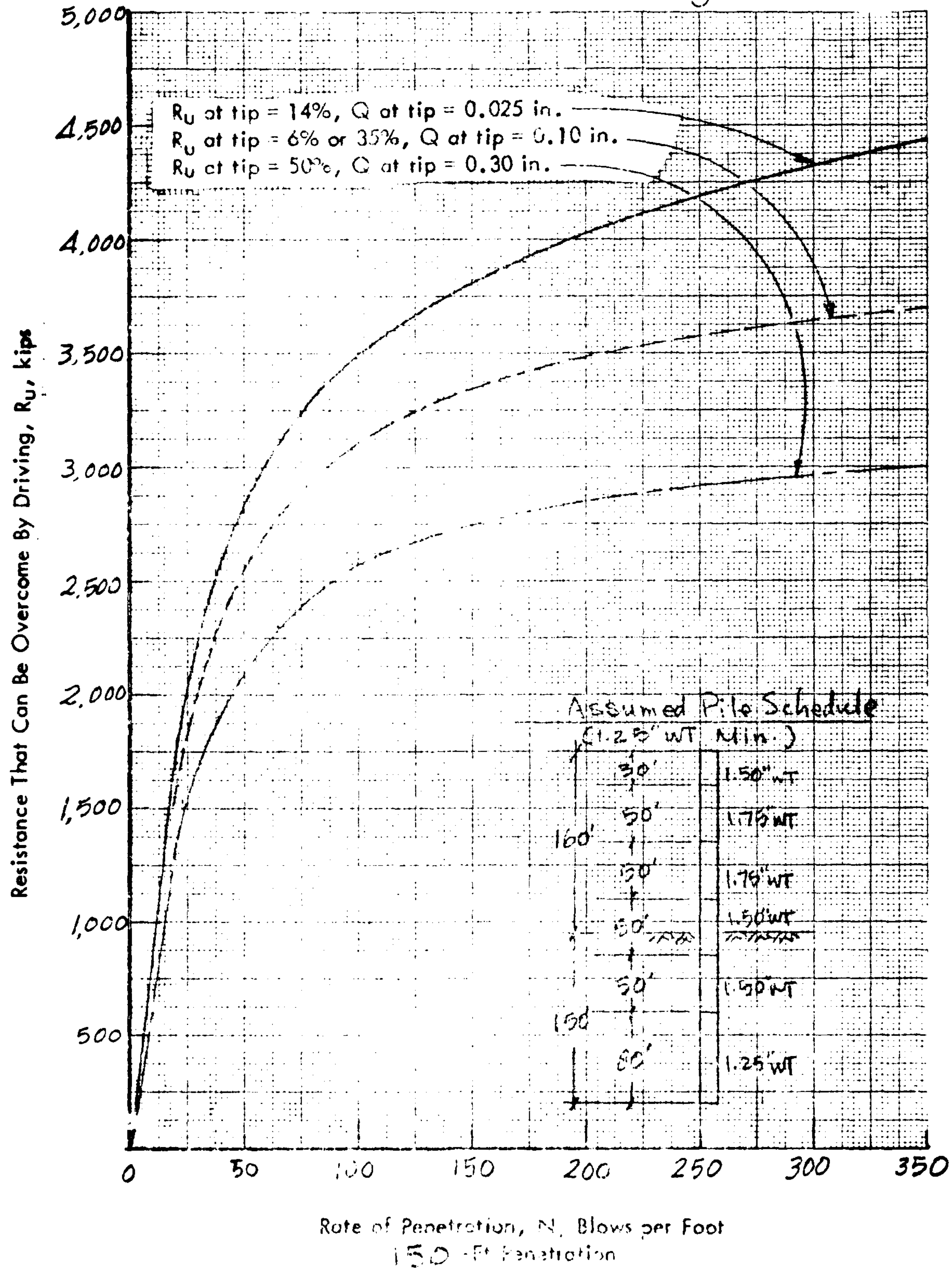
Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet C-4 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-10-76 Job No. 27-271-97 Calculation Pile Driving Resistance Curves

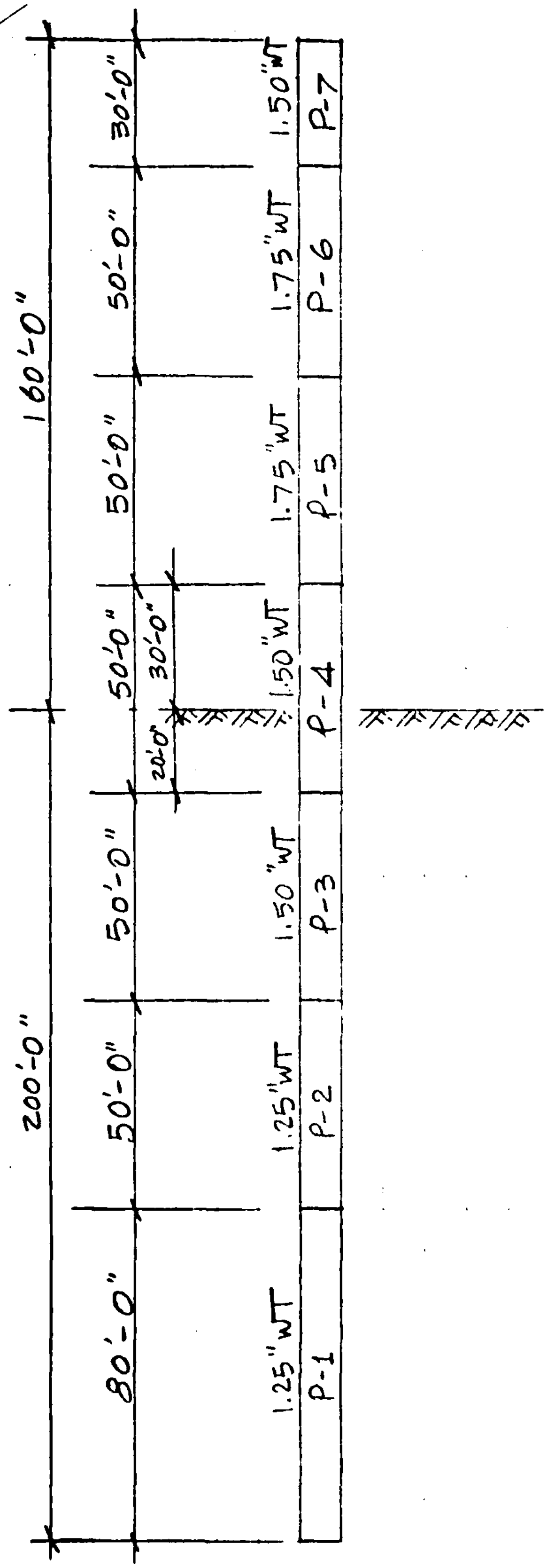


42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.5 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-8-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

200 FT Penetration

Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

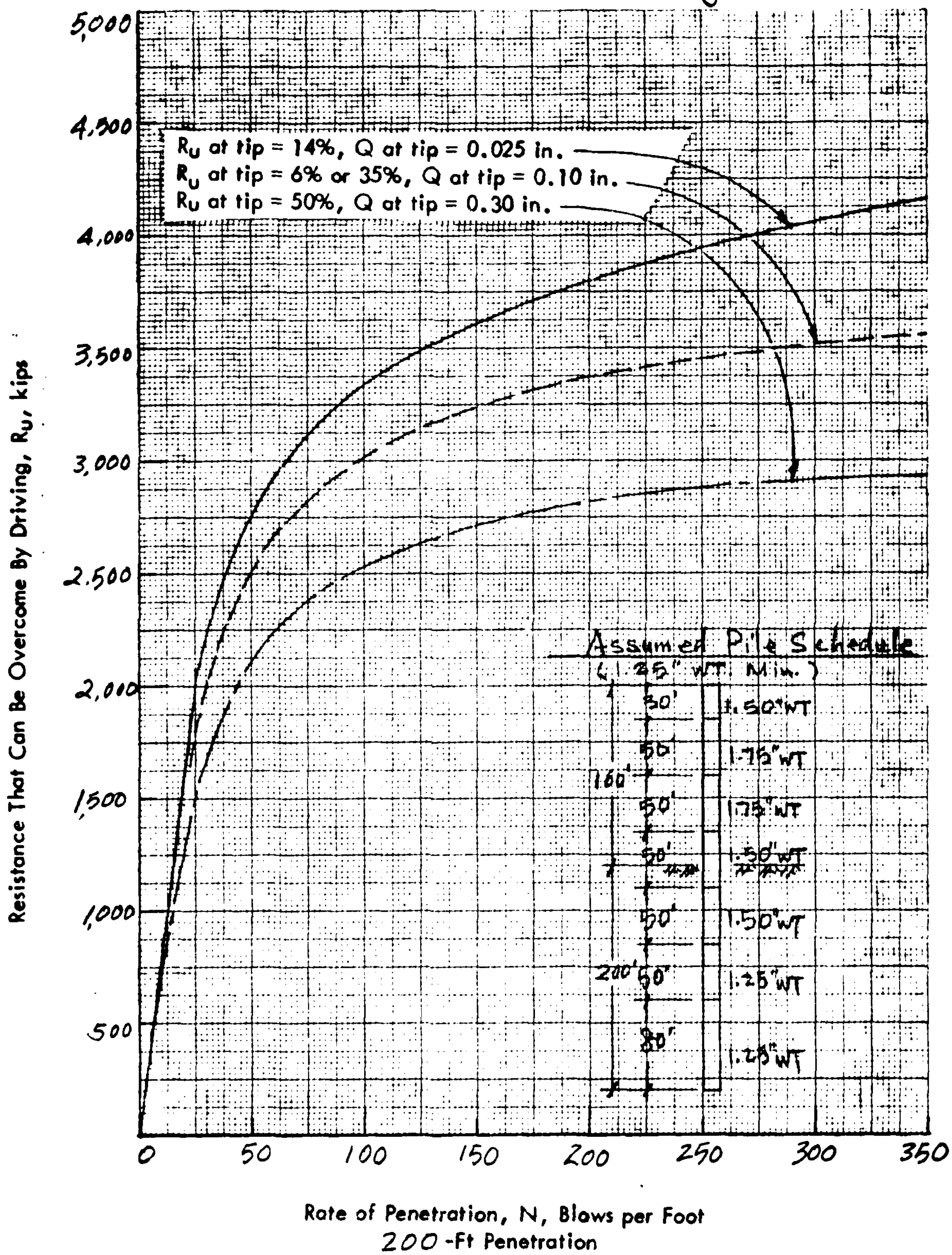
Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3-26 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-10-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



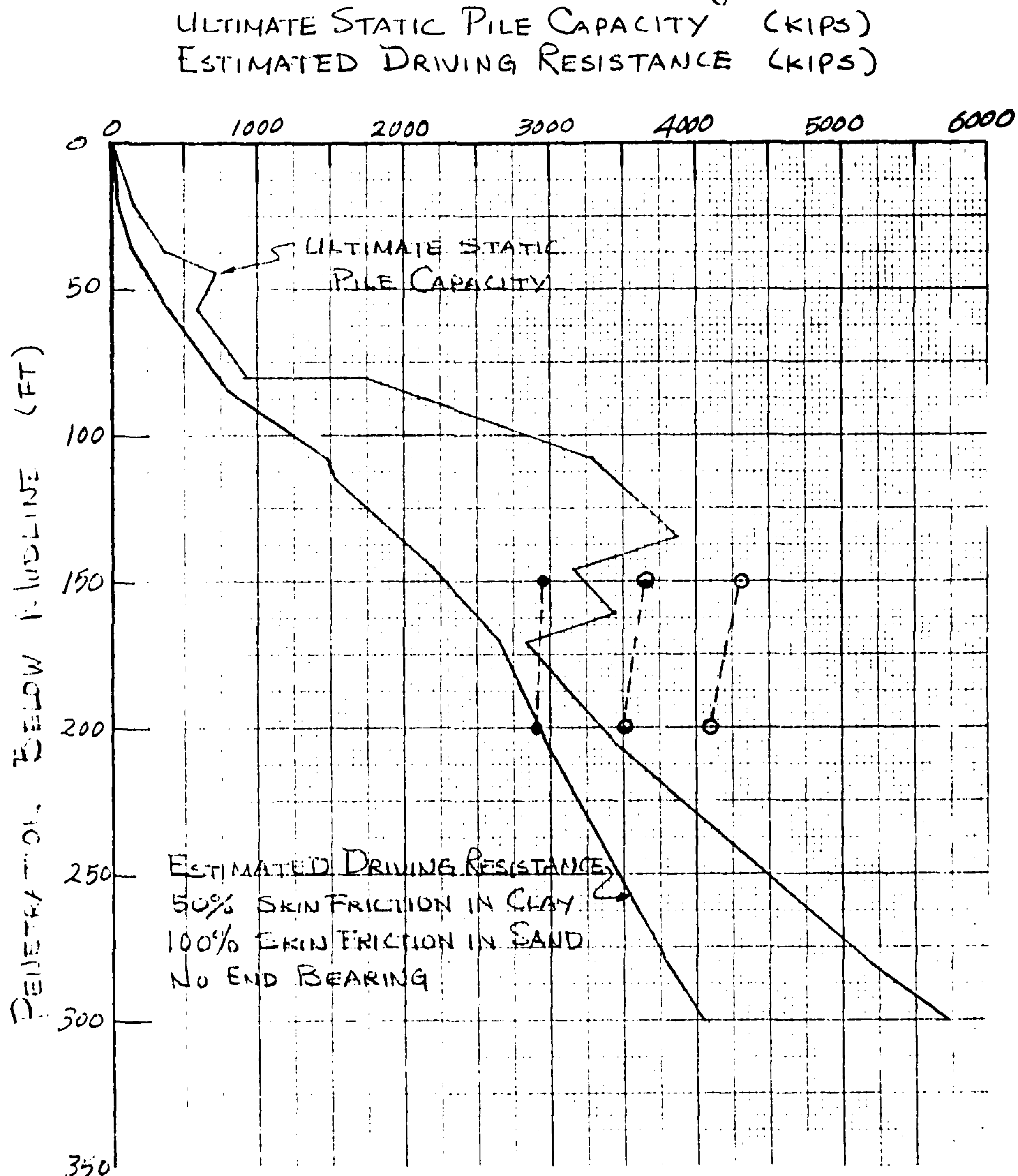
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.27 of 66

By C. Chen Client U.S. NAVY Subject Foundation Analysis

Date 6-11-76 Job No. 27-2-21-97 Calculation Pile Driving Resistance Curves



1.25" WT Min.

Vulcan 560 Hammer

(Boring # 1)

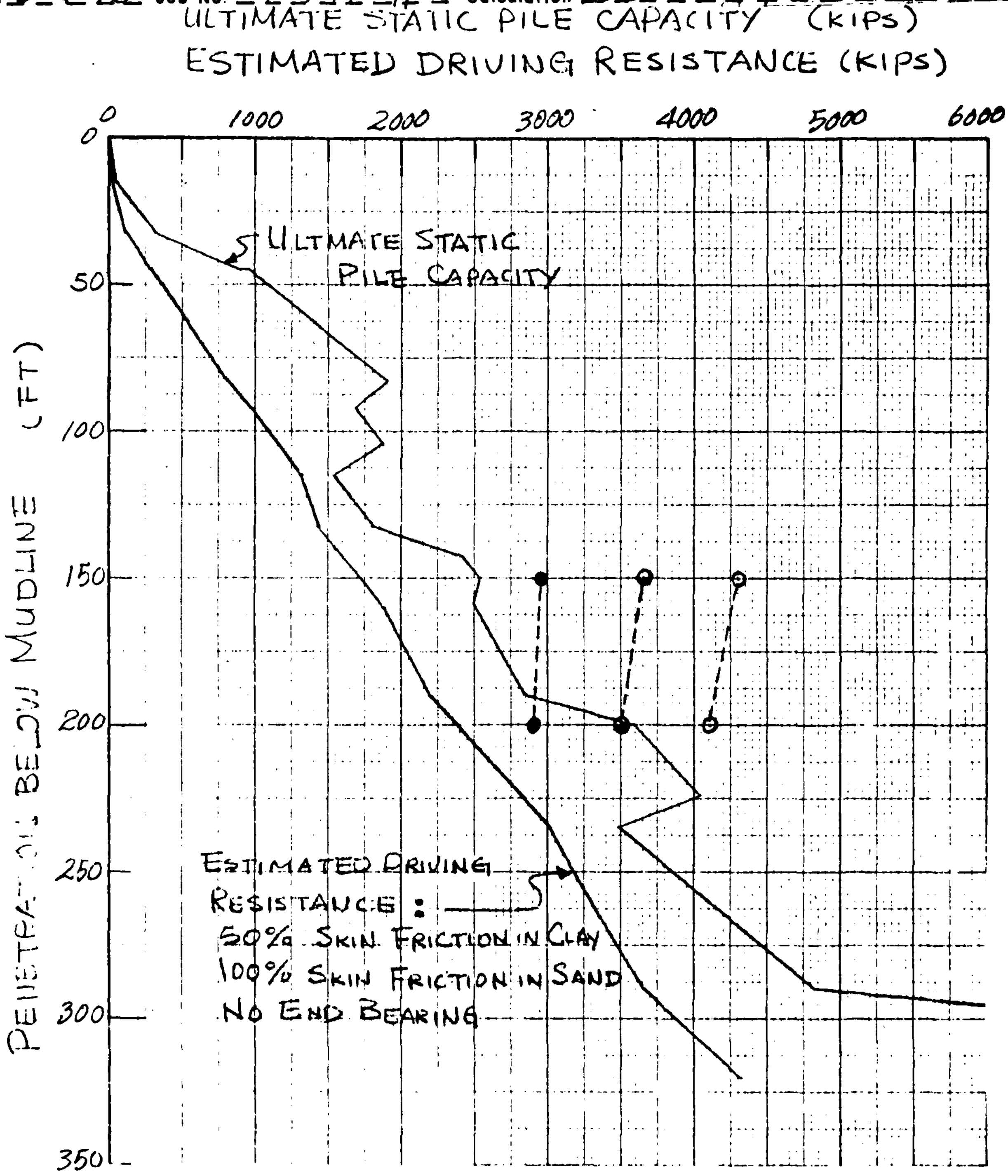
42-IN. DIAMETER PIPE PILES

CRESTOFFSHORE, INC.

Sheet 3-28 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-4-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



1.25" WT Min.

Vulcan 560 Hammer

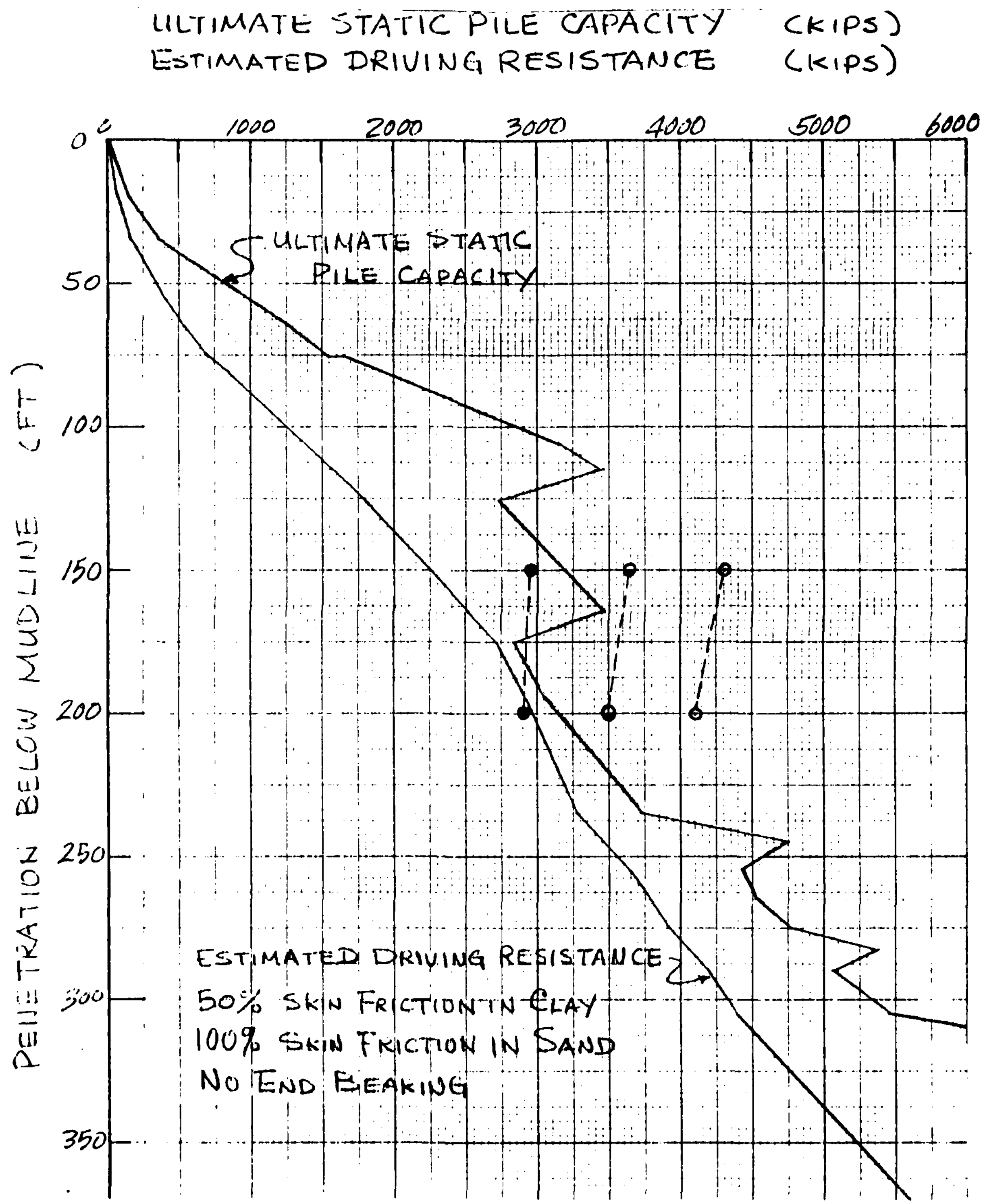
(Boring #2)

42-IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.29 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-01 Calculation Pile Driving Resistance Curves



1.25" WT Min.

Vulcan 560 Hammer

(Boring #3A)

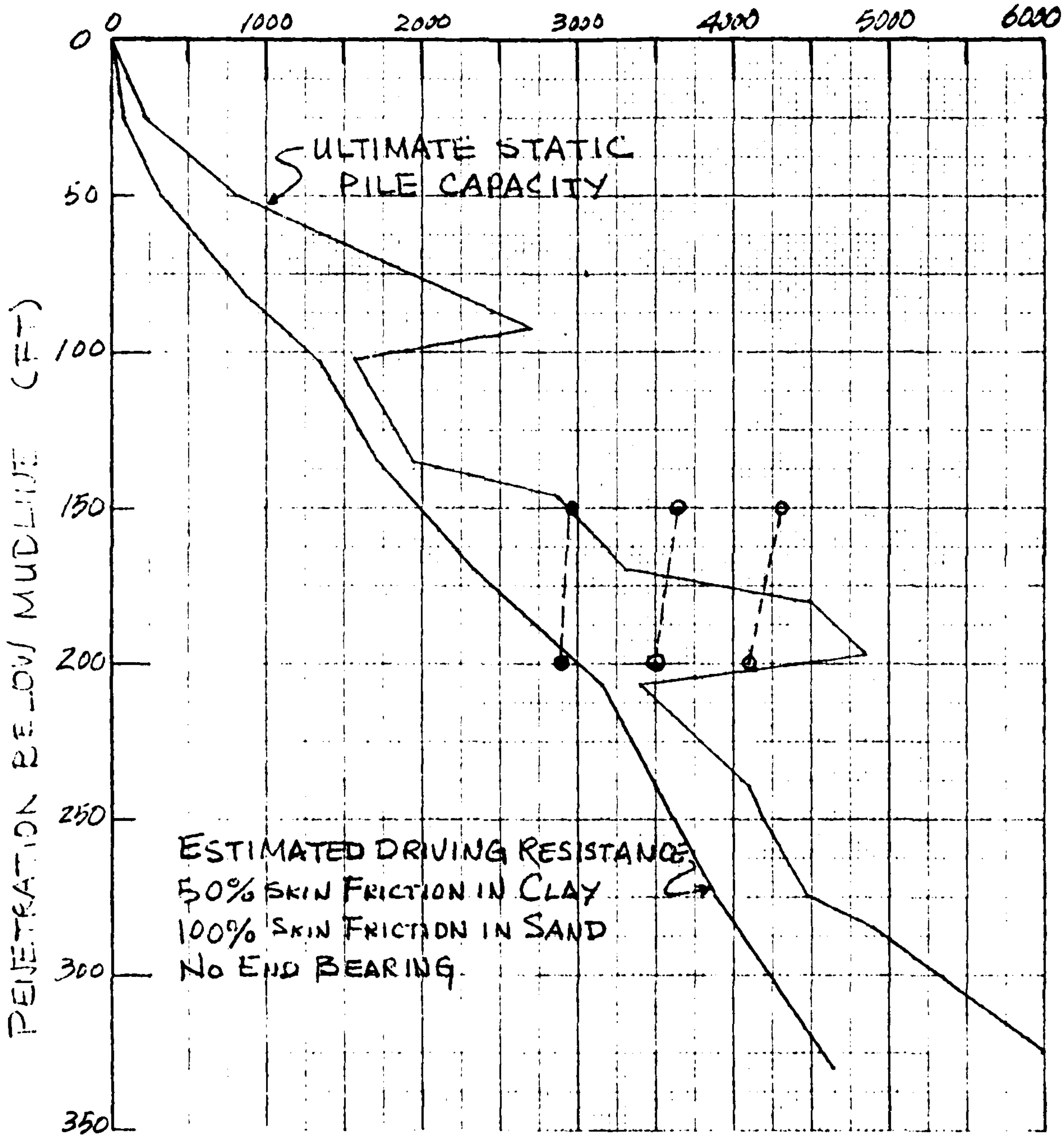
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet [illegible] of 66

By [illegible] Client U.S. Navy Subject Foundation Analysis
Date 9-4-76 Job No. [illegible] Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



1.25" WT Min.
Vulcan 560 Hammer

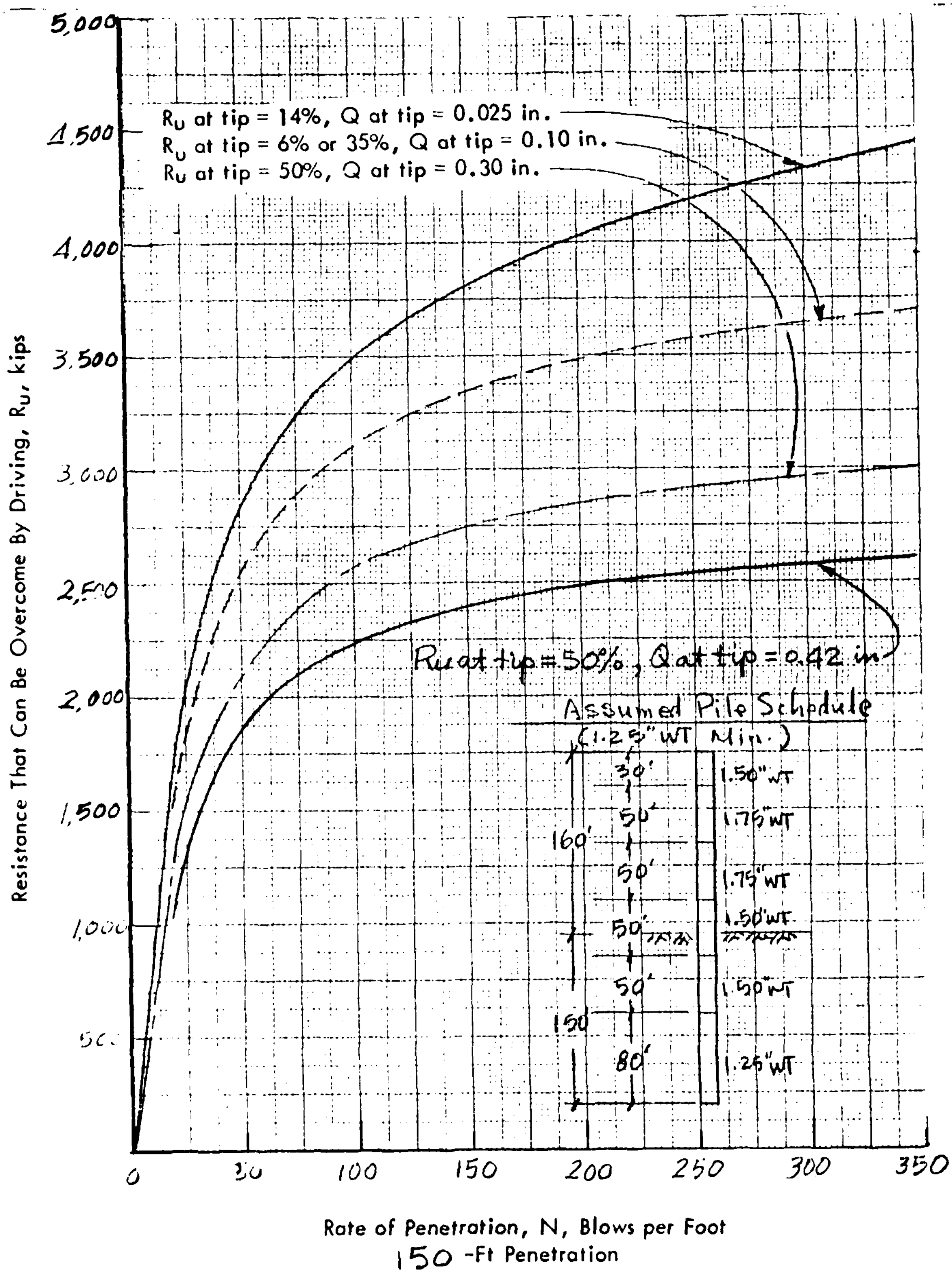
(Boring #4)

42 IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet E-31 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



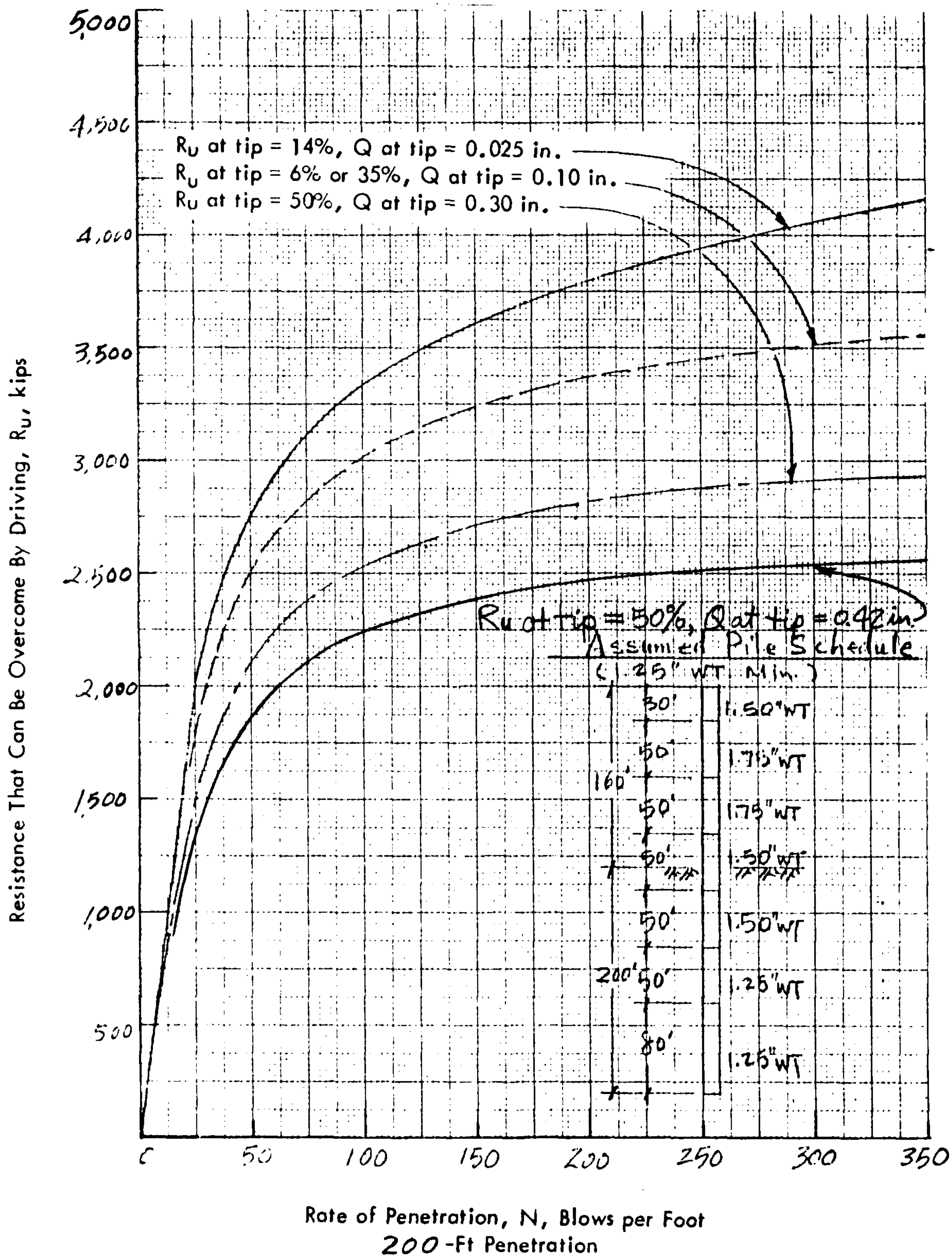
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 32 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 7-13-76 Job No. 27-771-91 Calculation Pile Driving Resistance Curves



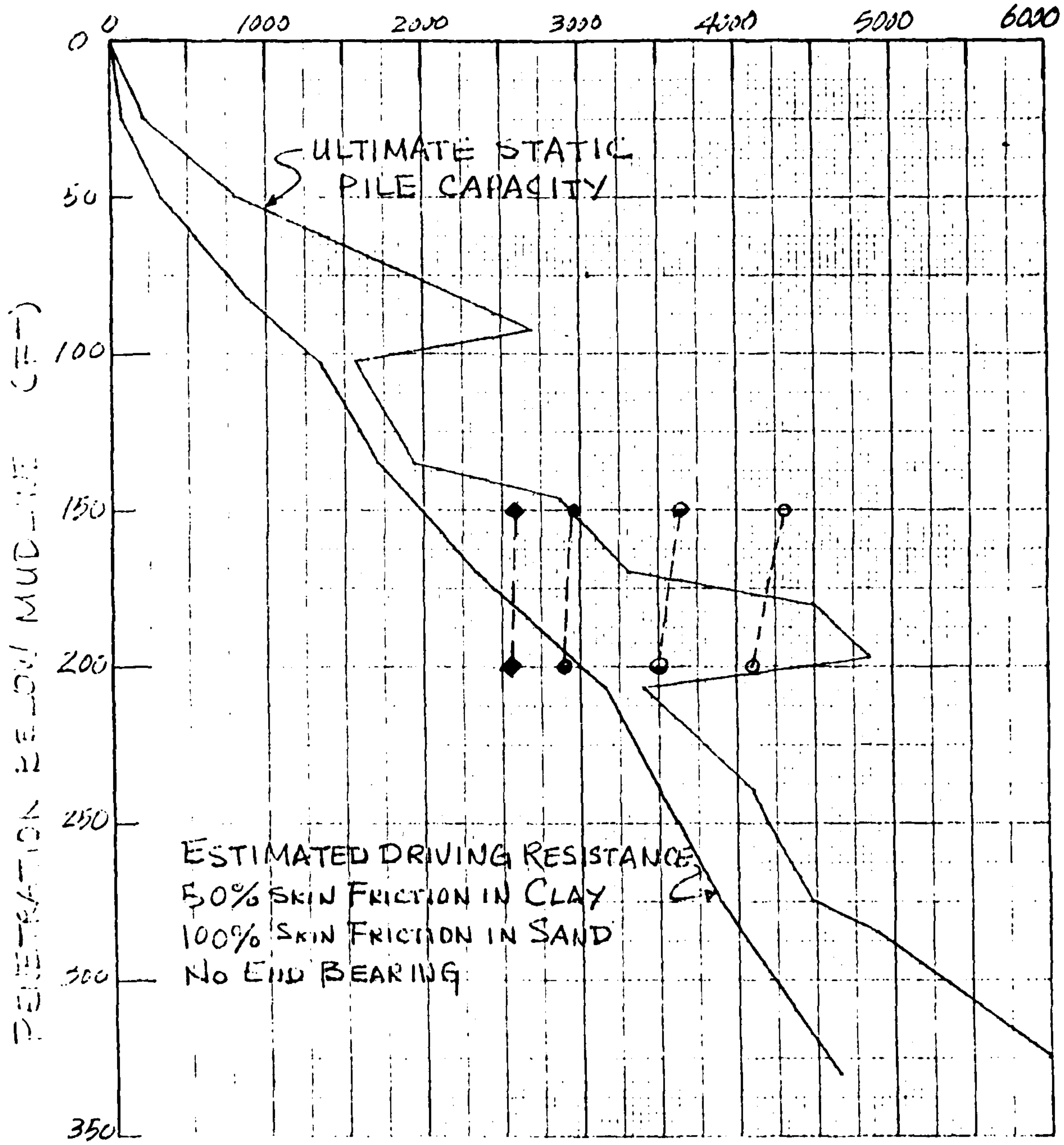
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 2-36 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



1.25" WT Min.
Vulcan 560 Hammer

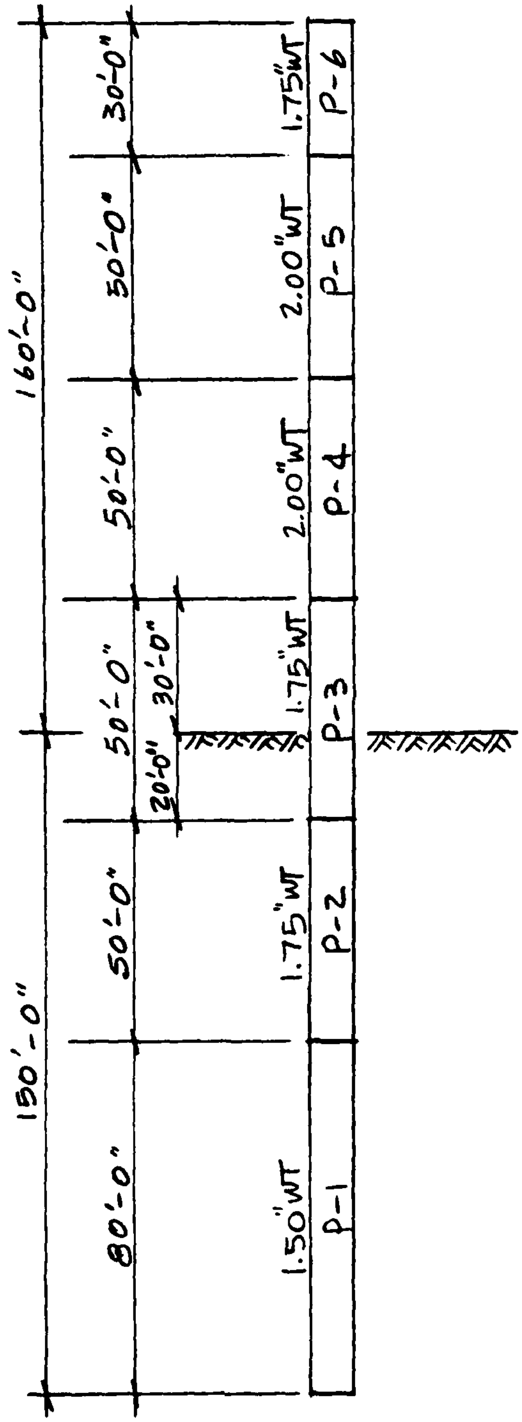
(Boring #4)

42 in. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3-38 of 60

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-10-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

150 FT Penetration

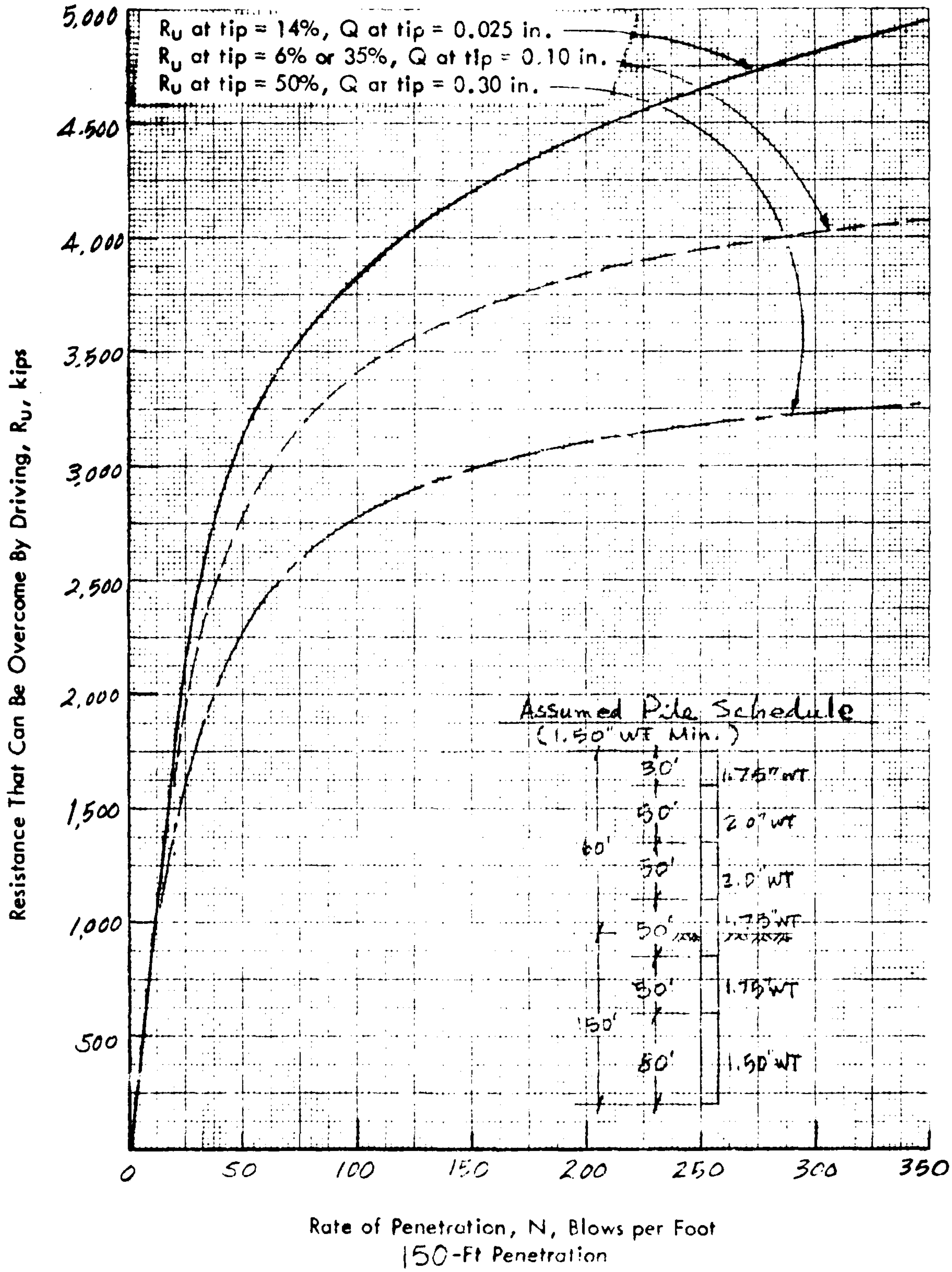
Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 39 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-11-76 Job No. 22-771-97 Calculation Driving Resistance Curves

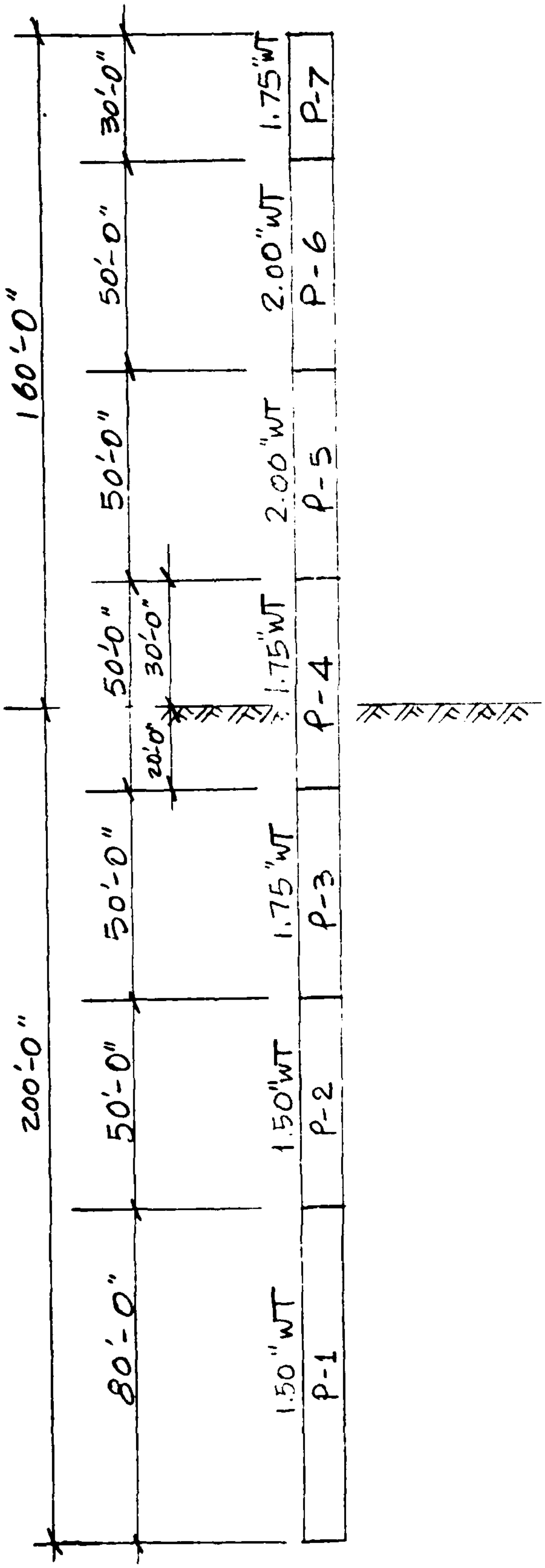


42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3-40 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-10-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

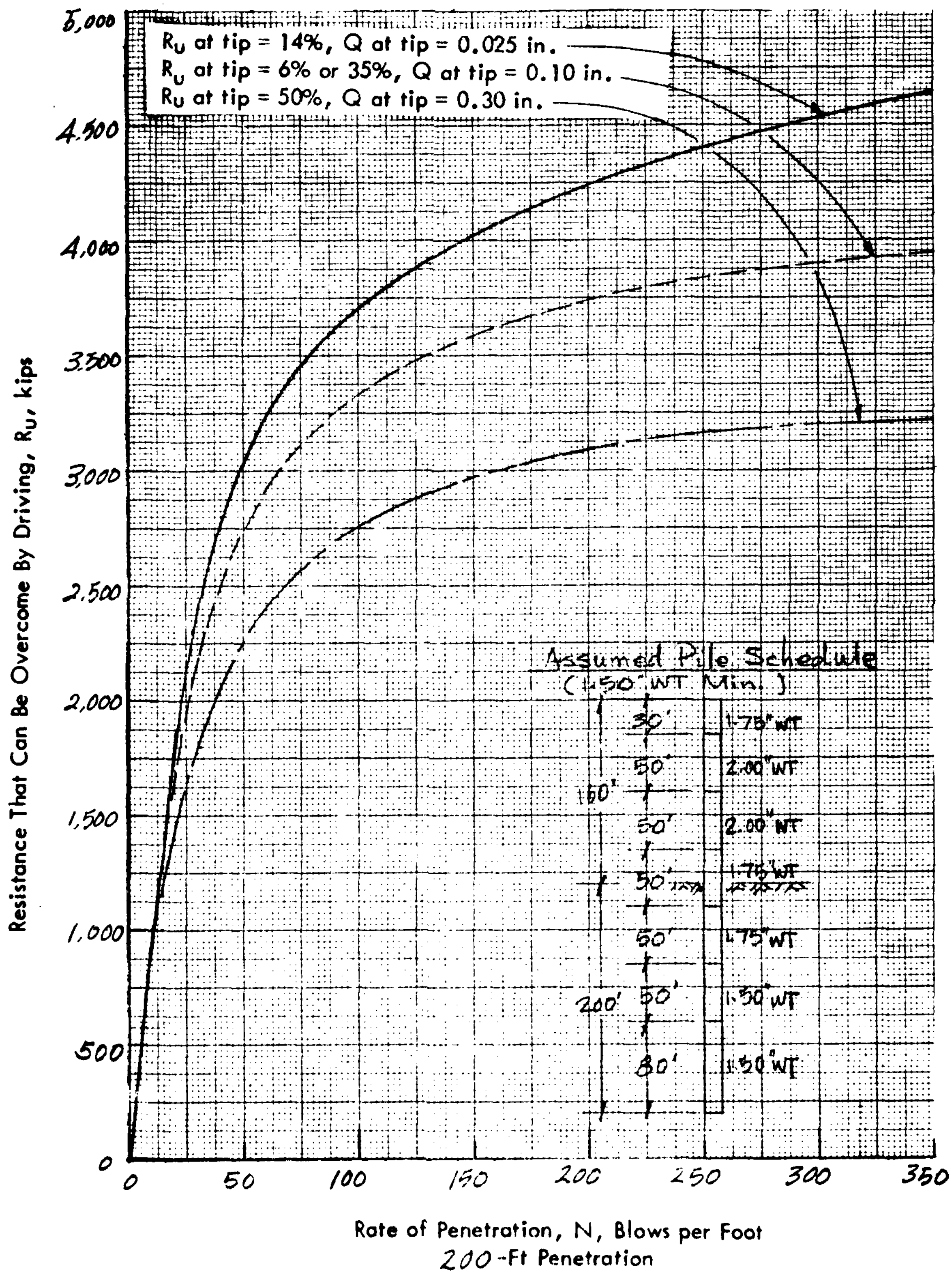
200 FT Penetration

Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-11-76 Job No. 27-77L-97 Calculation Pile Driving Resistance Curves



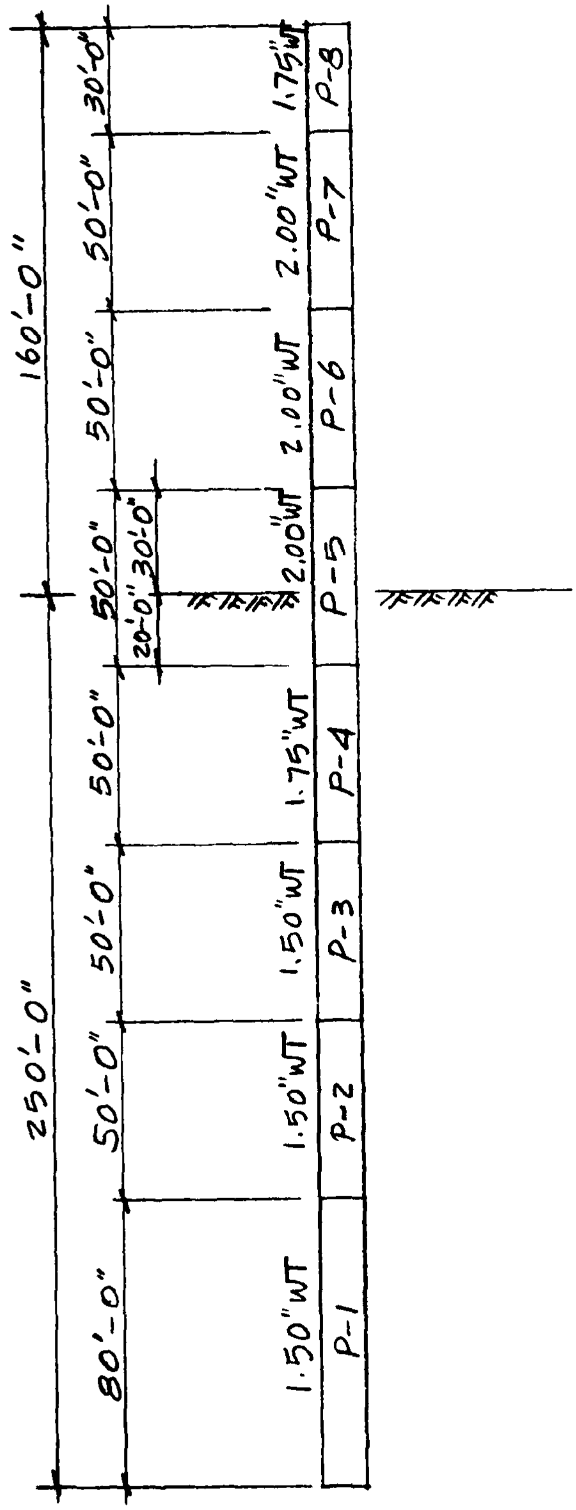
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-25-76 Job No. 27-171-97 Calculation Pile Driving Resistance Curves

MLW = 105'-0"

250 FT Penetration



Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

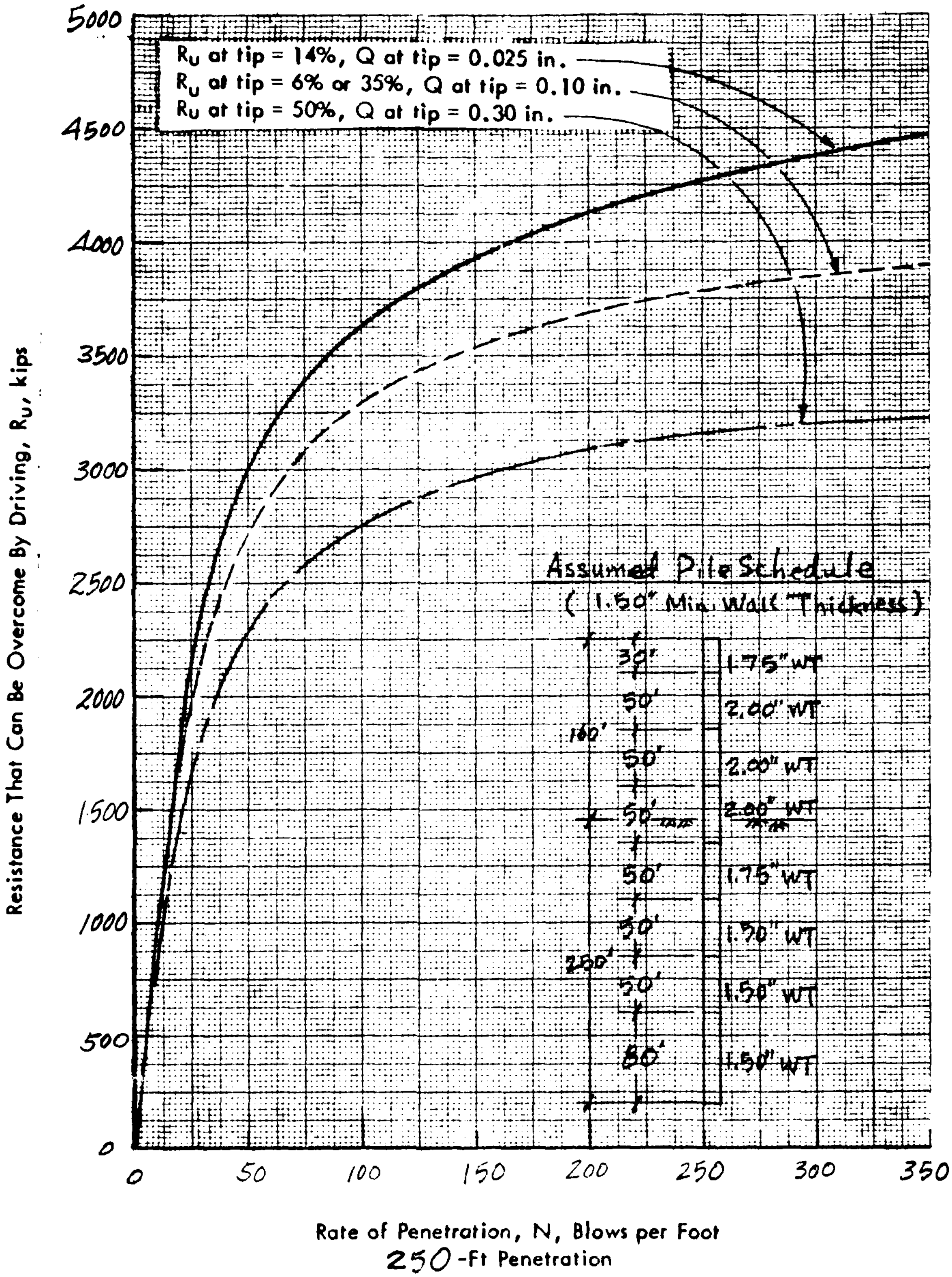
Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3-13 of 66

By C. Chen Client U.S. NAVY Subject Foundation Analysis

Date 6-25-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

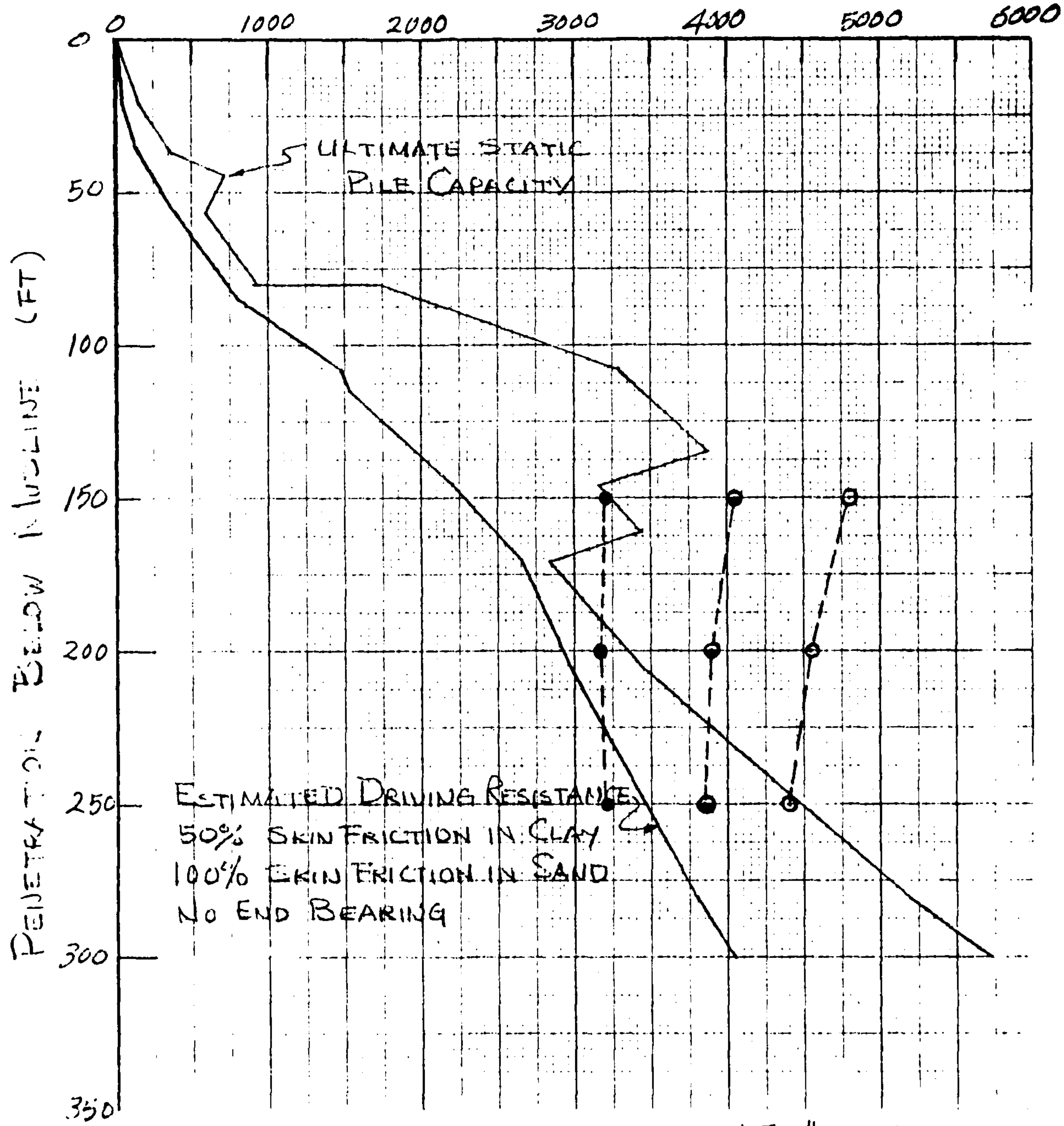


42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-11-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



1.50" WT Min.
Vulcan 560 Hammer

(Boring #1)

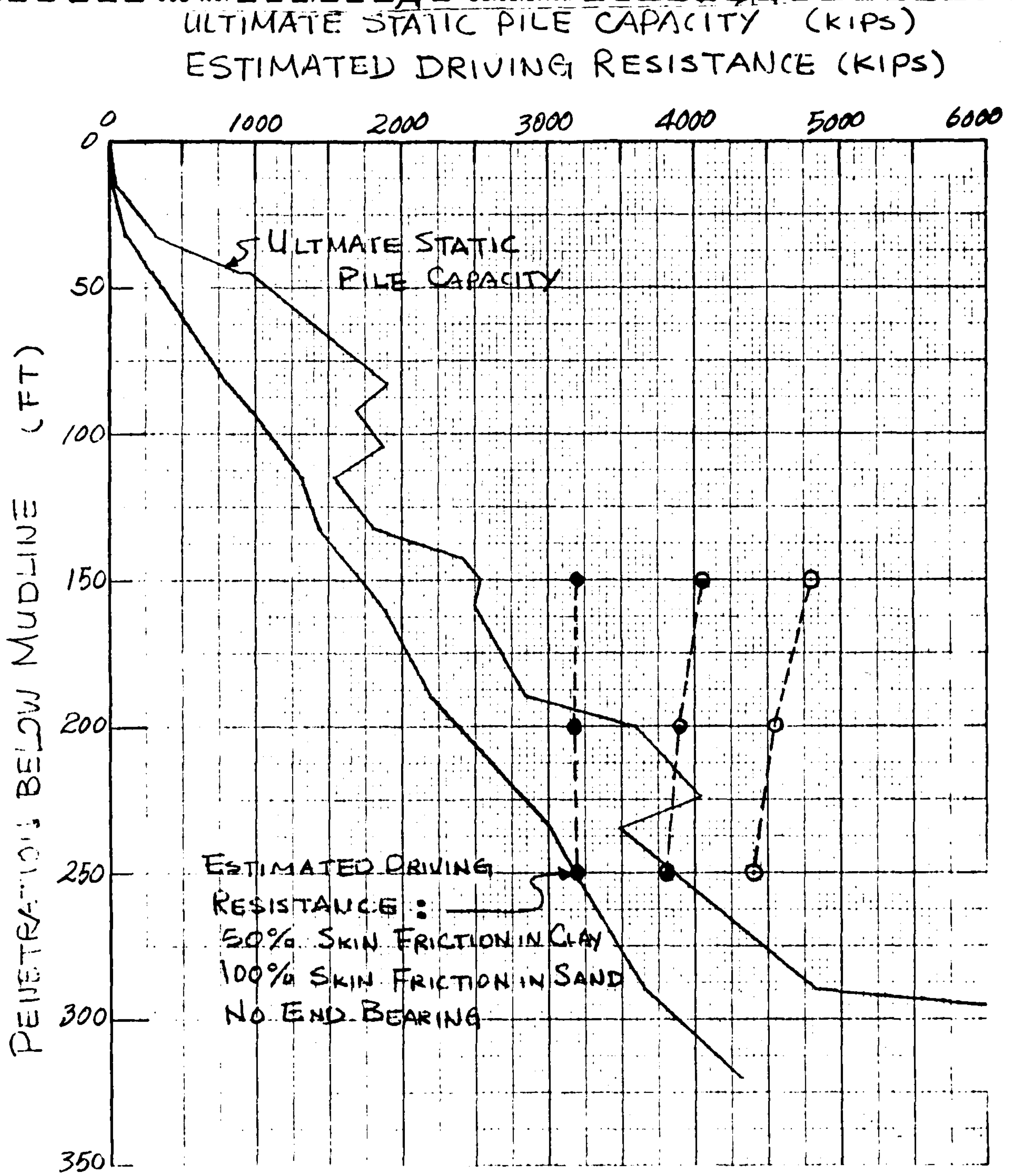
42-IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3-45 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-4-76 Job No. 27-771-91 Calculation Pile Driving Resistance Curves



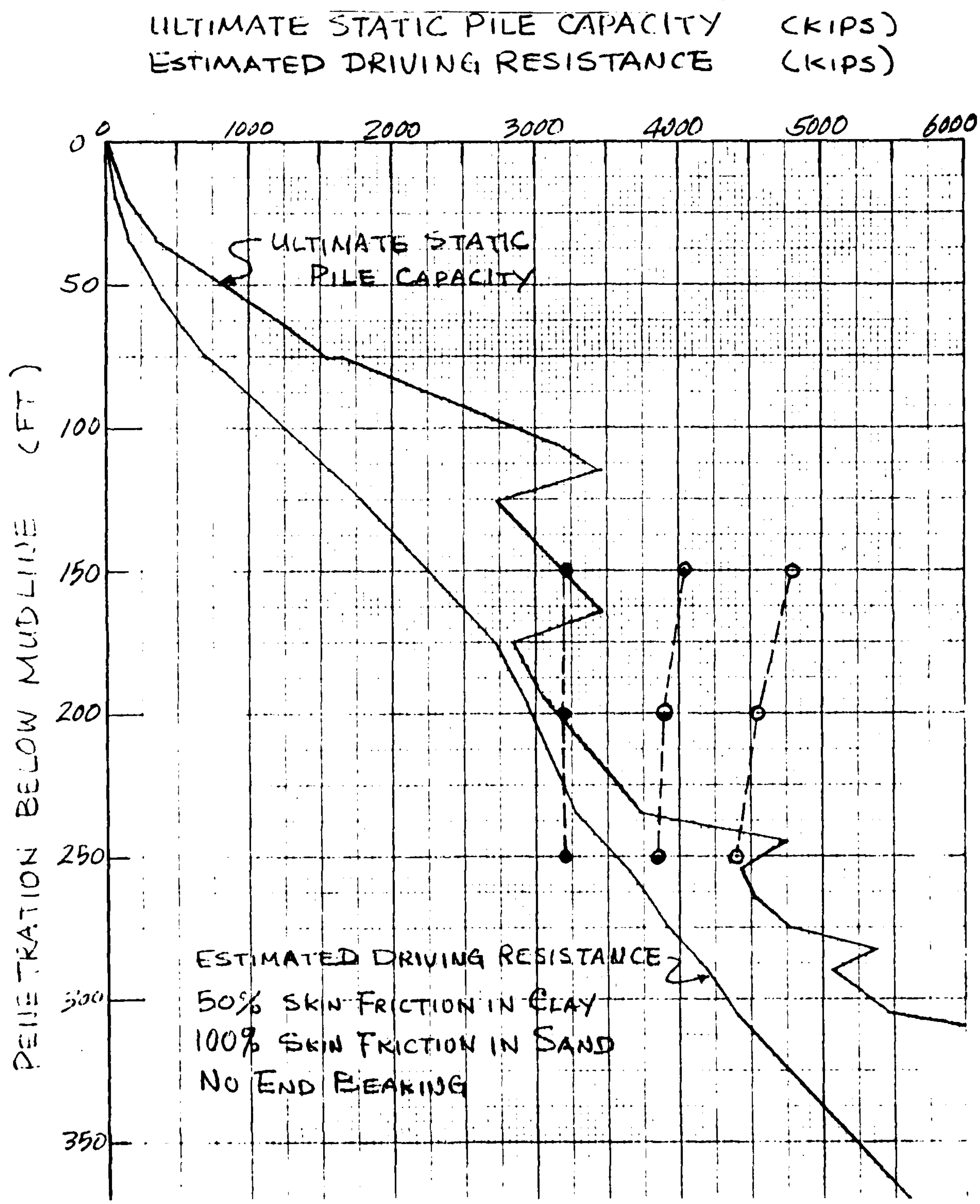
1.50" WT Min.
Vulcan 560 Hammer

(Boring #2)

42-IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-771-91 Calculation Pile Driving Resistance Curves



1.50" WT Min.
Vulcan 560 Hammer

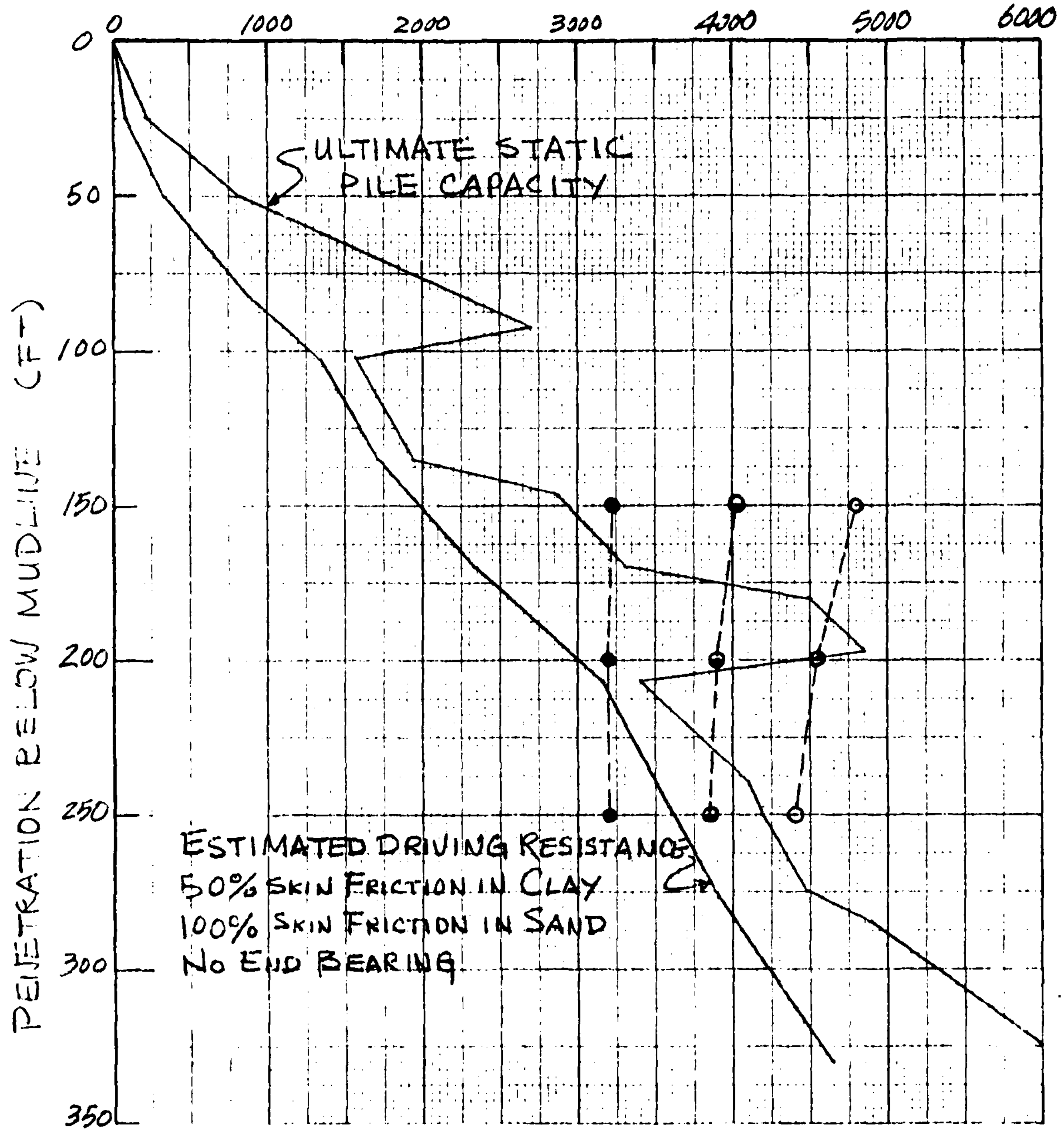
(Boring #3A)
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.47 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-4-76 Job No. 27-77L-91 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



1.50" WT Min.

Vulcan 560 Hammer

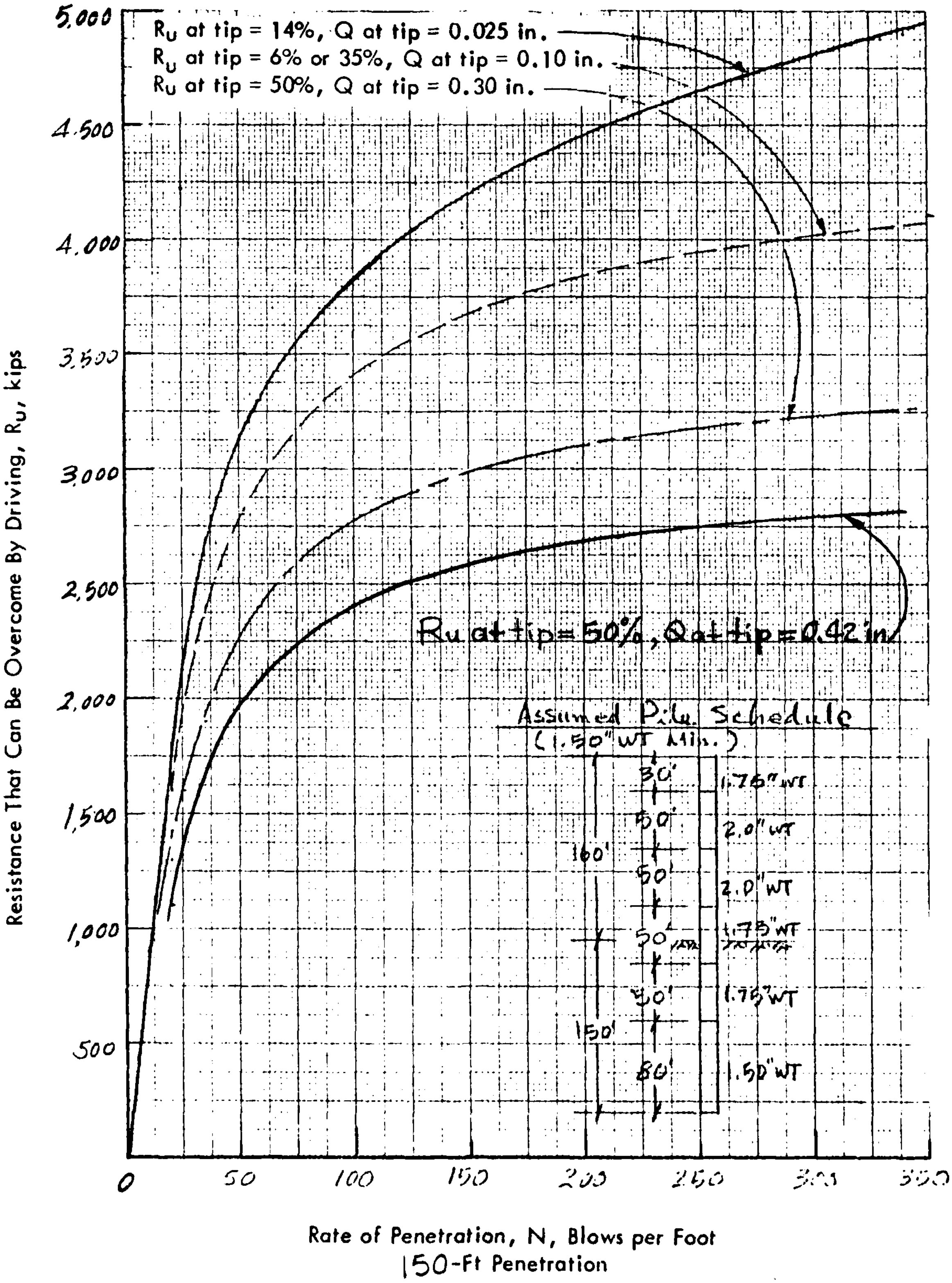
(Boring #4)

42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.48 of 66

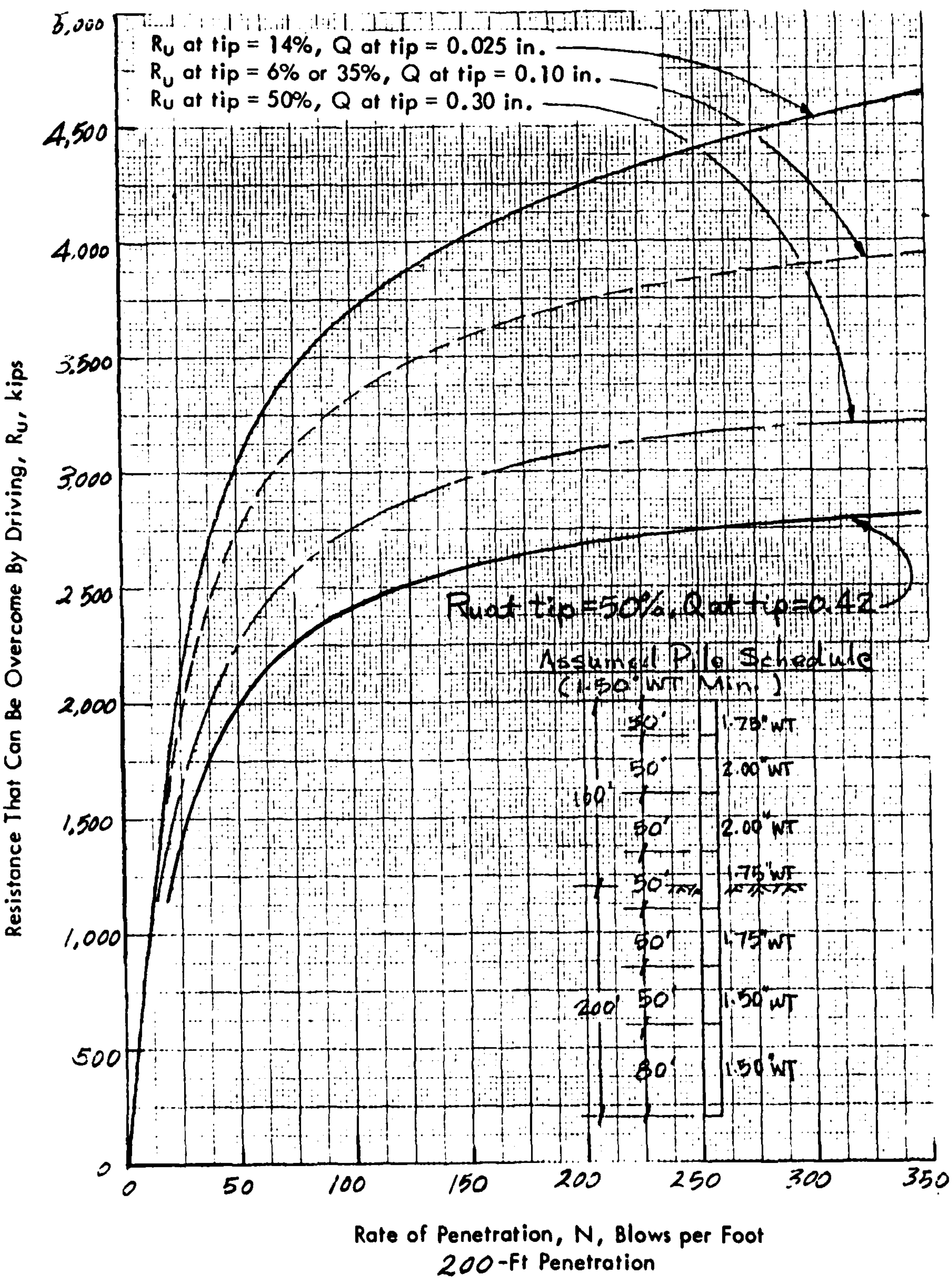
By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-26 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

By C. Cherr Client U. S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 27-72L-87 Calculation Pile Driving Resistance Curves

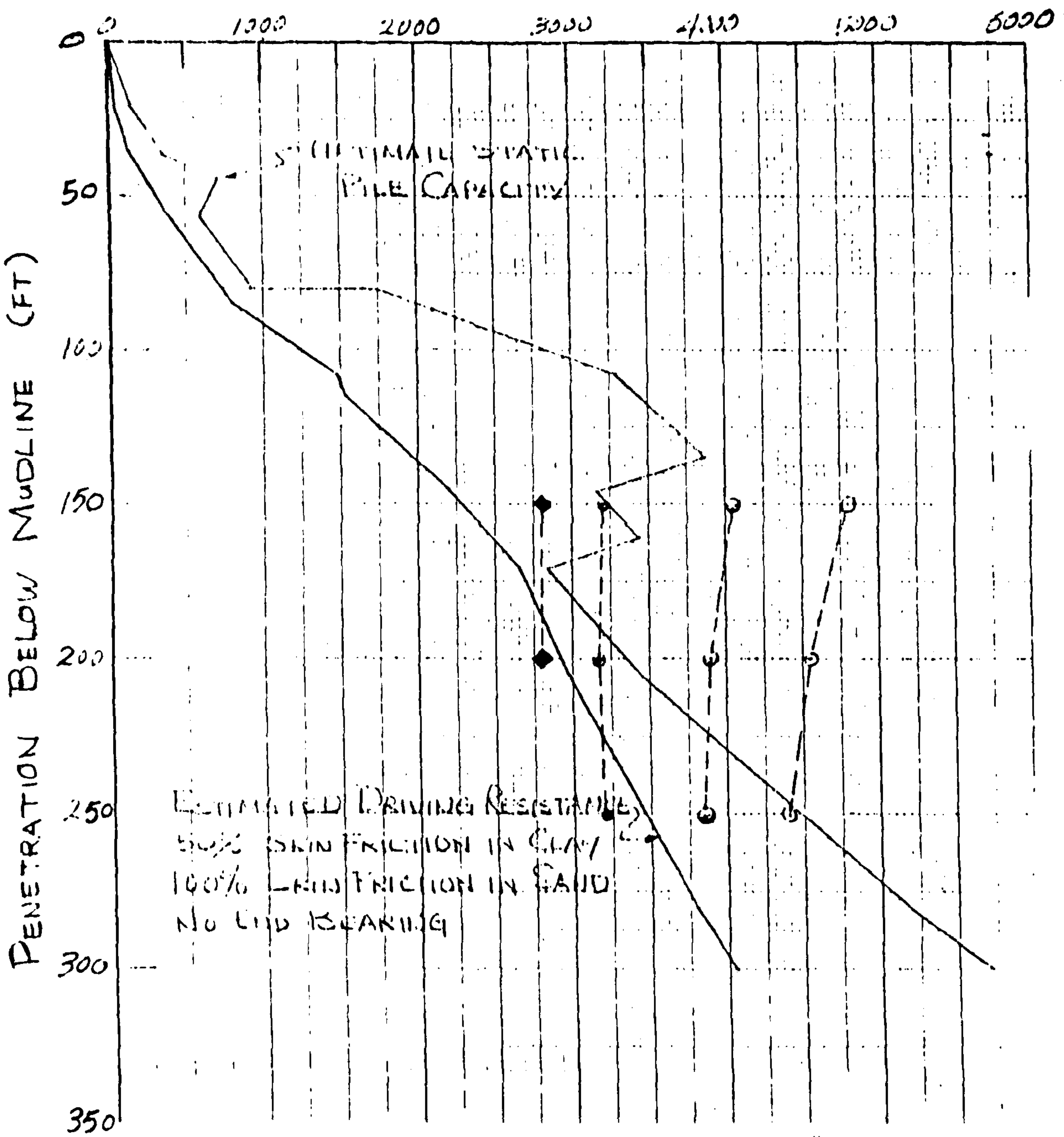


42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 50 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 77-771-97 Calculation Pile Driving Resistance Curves

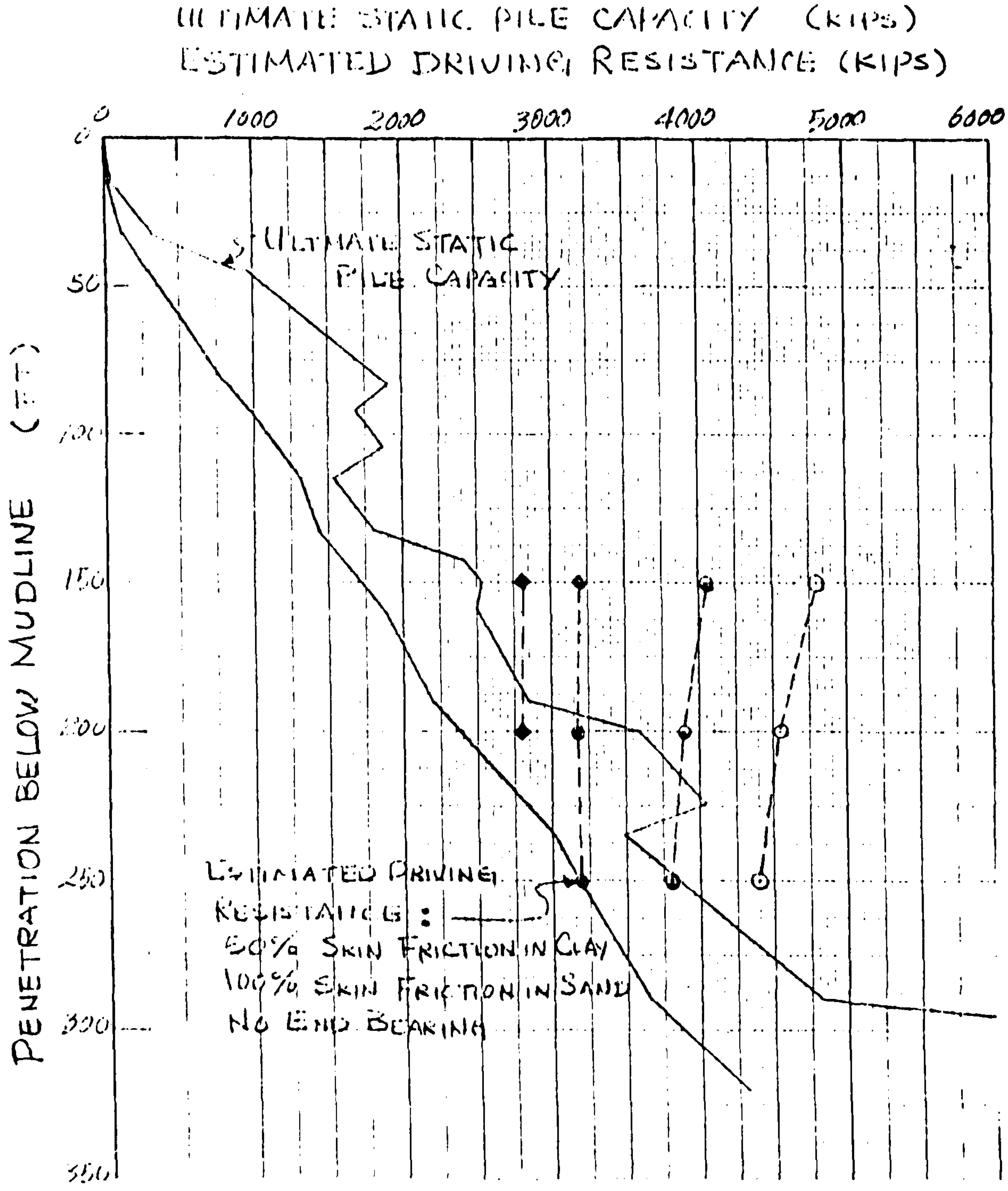


(Boring # 1)

42-in DIAMETER PIPE PILES

CREST OFFSHORE, INC. Sheet 3-51 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



1.50" WT Min.
Vulcan 560 Hammer

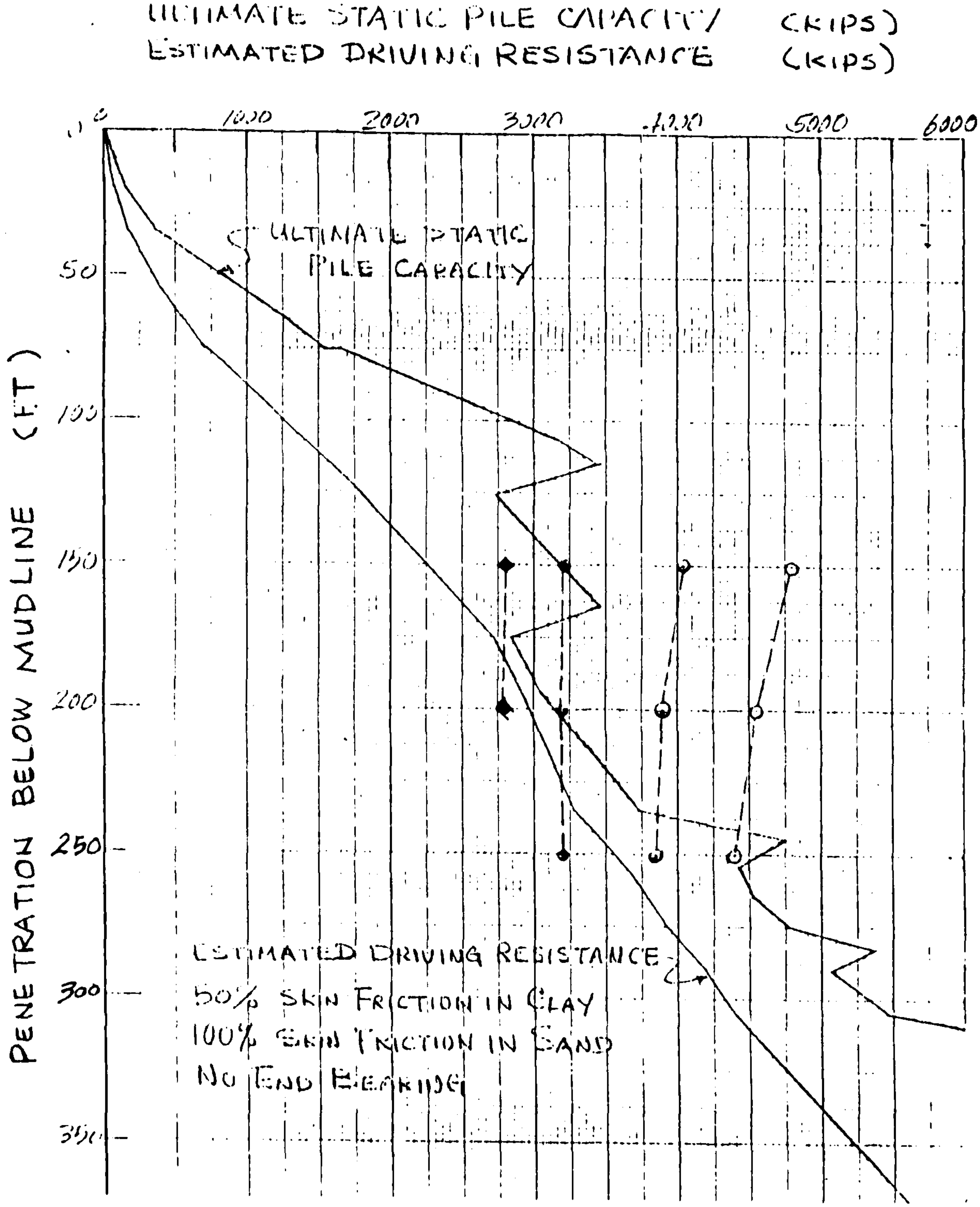
(Boring #2)

48 IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 32 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



1.50" wr Hm.
Vulcan 560 Hammer

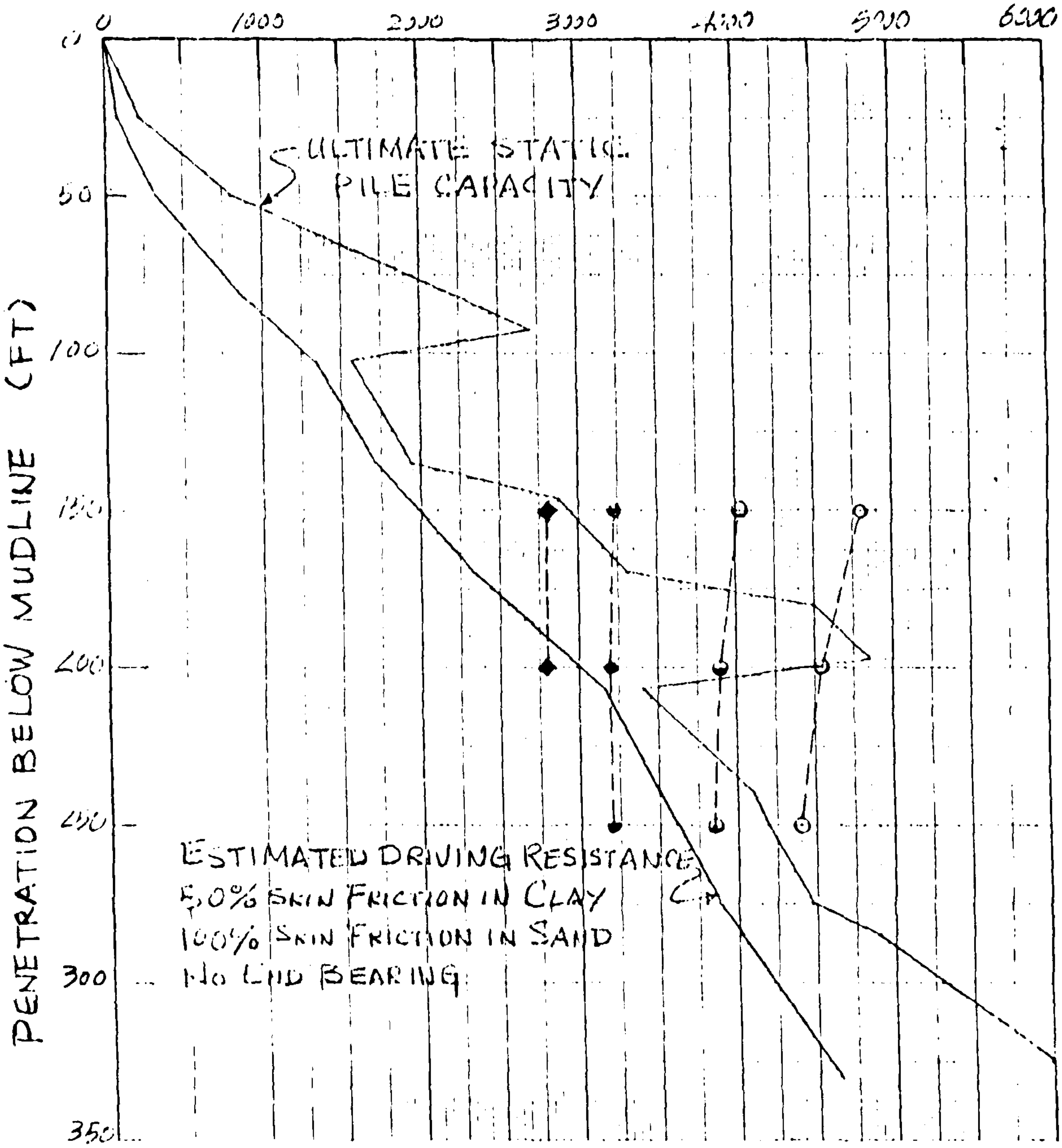
(Boring #3A)
42-in. Diameter Pipe Piles

CREST OFFSHORE, INC.

Sheet 3-3 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 7-13-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



150" wt Min.
Vulcan 560 Hammer

(Boring 1)

42 in. DIAMETER PIPE PILES

3.6 PILE SCHEDULE NO. 4 -- 2.00 IN. UNIFORM WALL THICKNESS

3.6 PILE SCHEDULE NO. 4 -- 2.00 IN. UNIFORM WALL THICKNESS

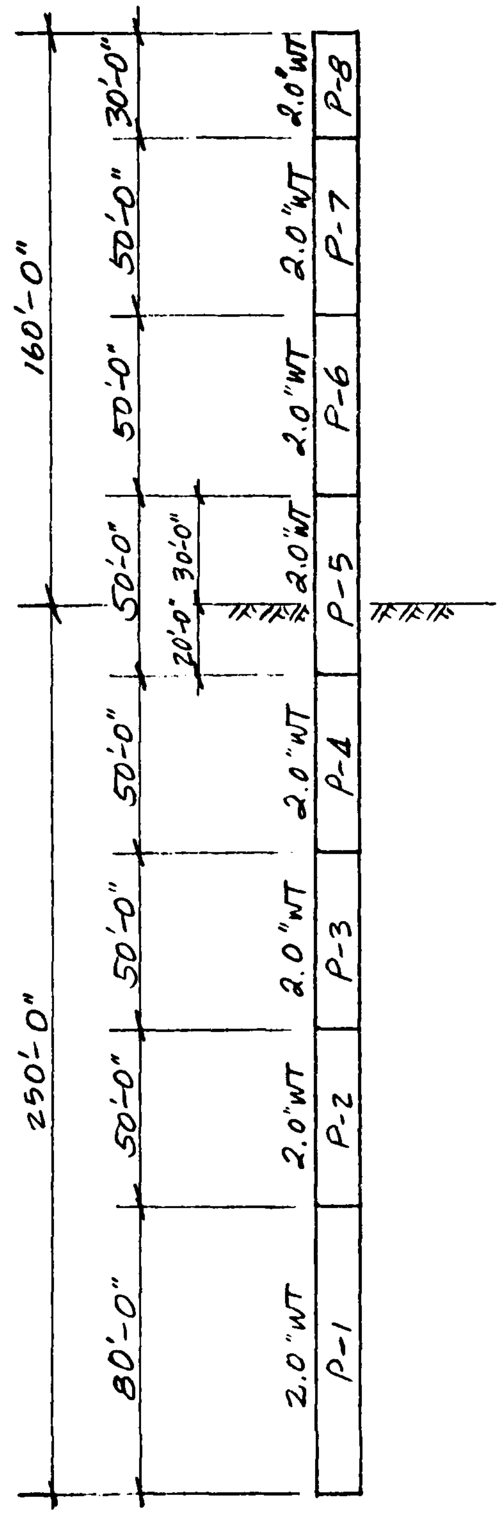
CREST OFFSHORE, INC.

Sheet 25 of 66

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-25-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

MLW = 105'-0"

250 FT Penetration



Vulcan 560 Hammer
Wt. of Ram = 60,000 lbs
Rated Energy = 300,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 42,000 lbs

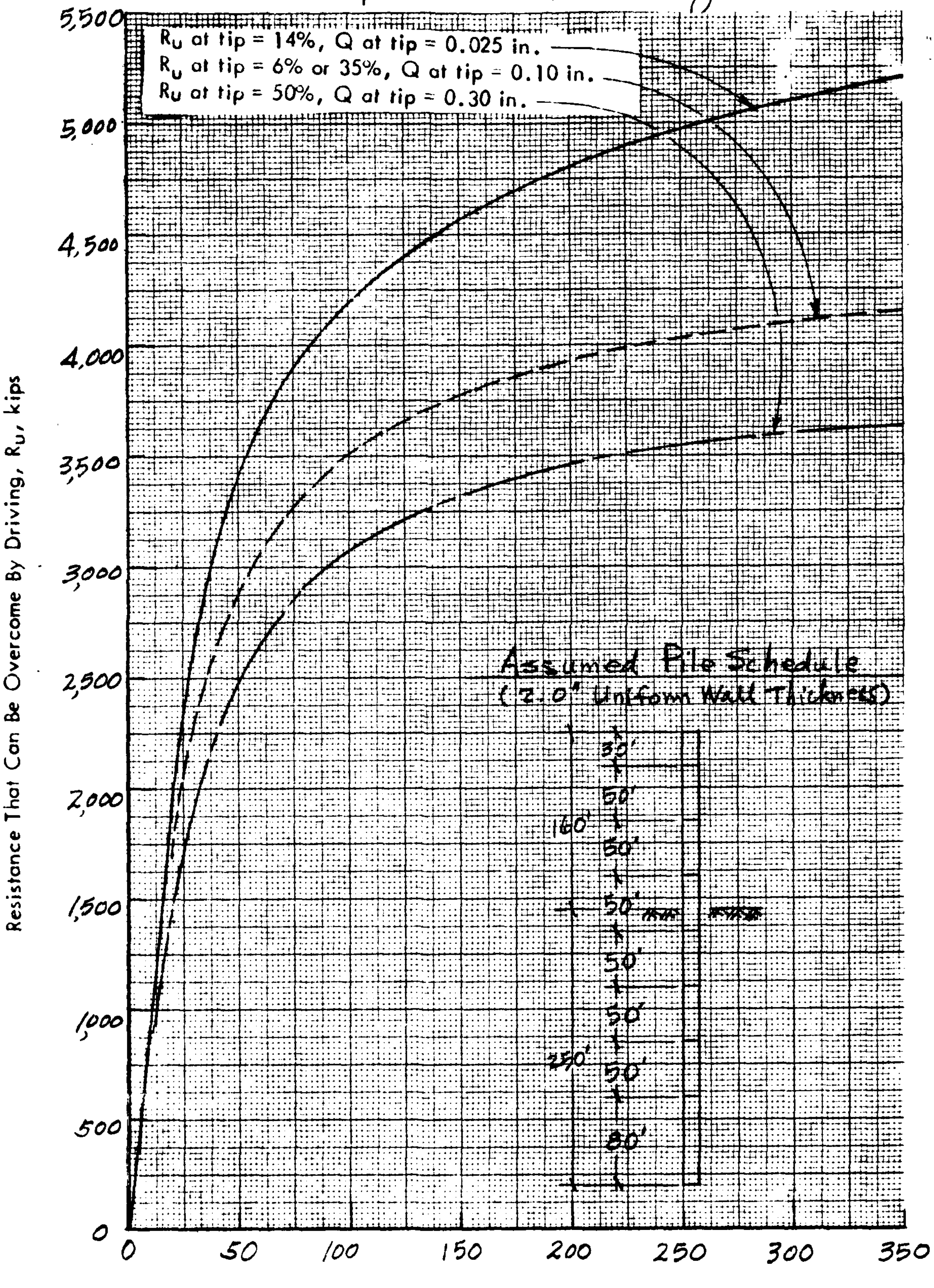
Spring Constant = 6.2×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3-26 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 6-28-76 Job No 27-271-97 Calculation Pile Driving Resistance Curves

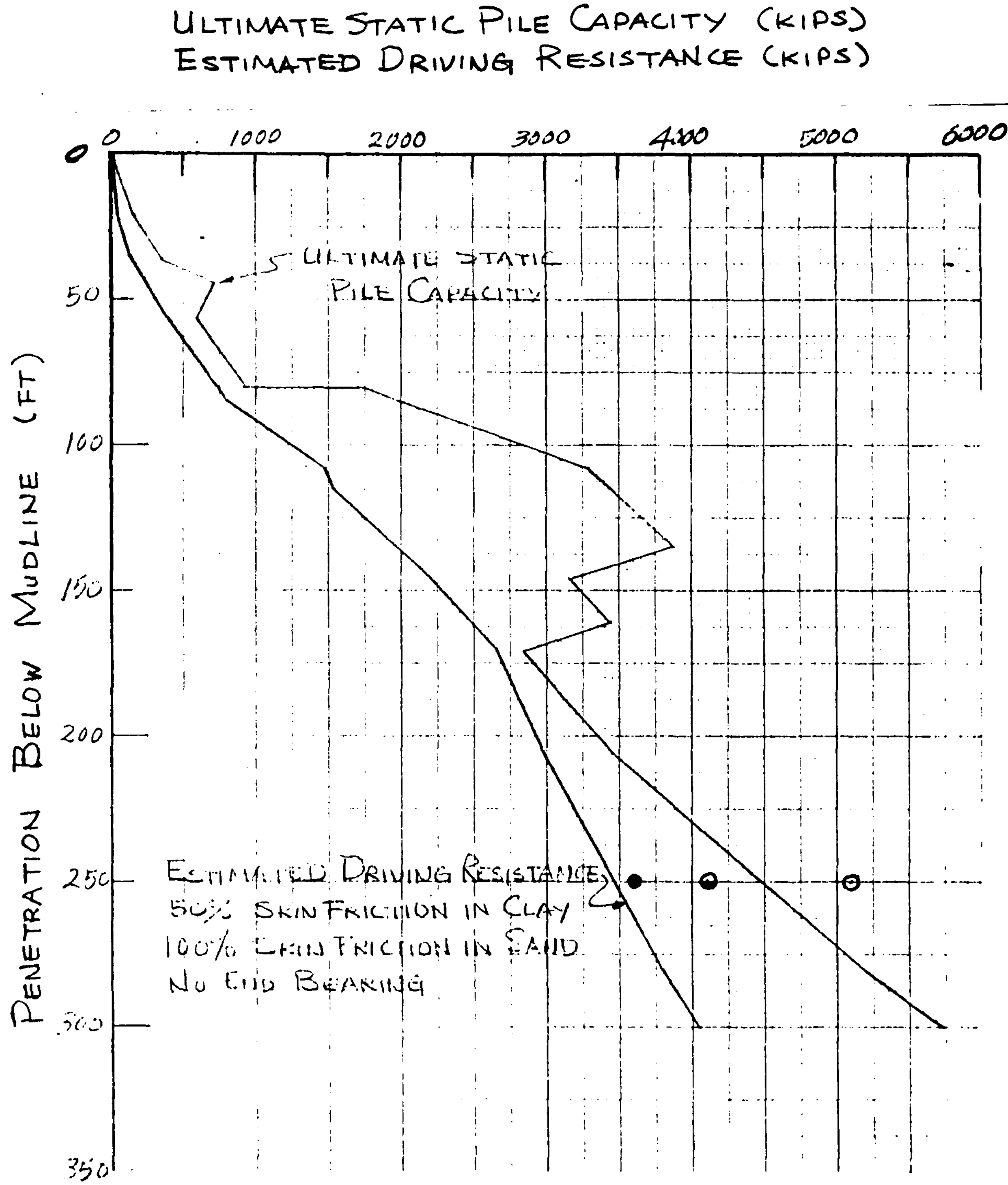


250-Ft Penetration

CREST OFFSHORE, INC.

Sheet 3-27 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-28-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



2-in Uniform Wall

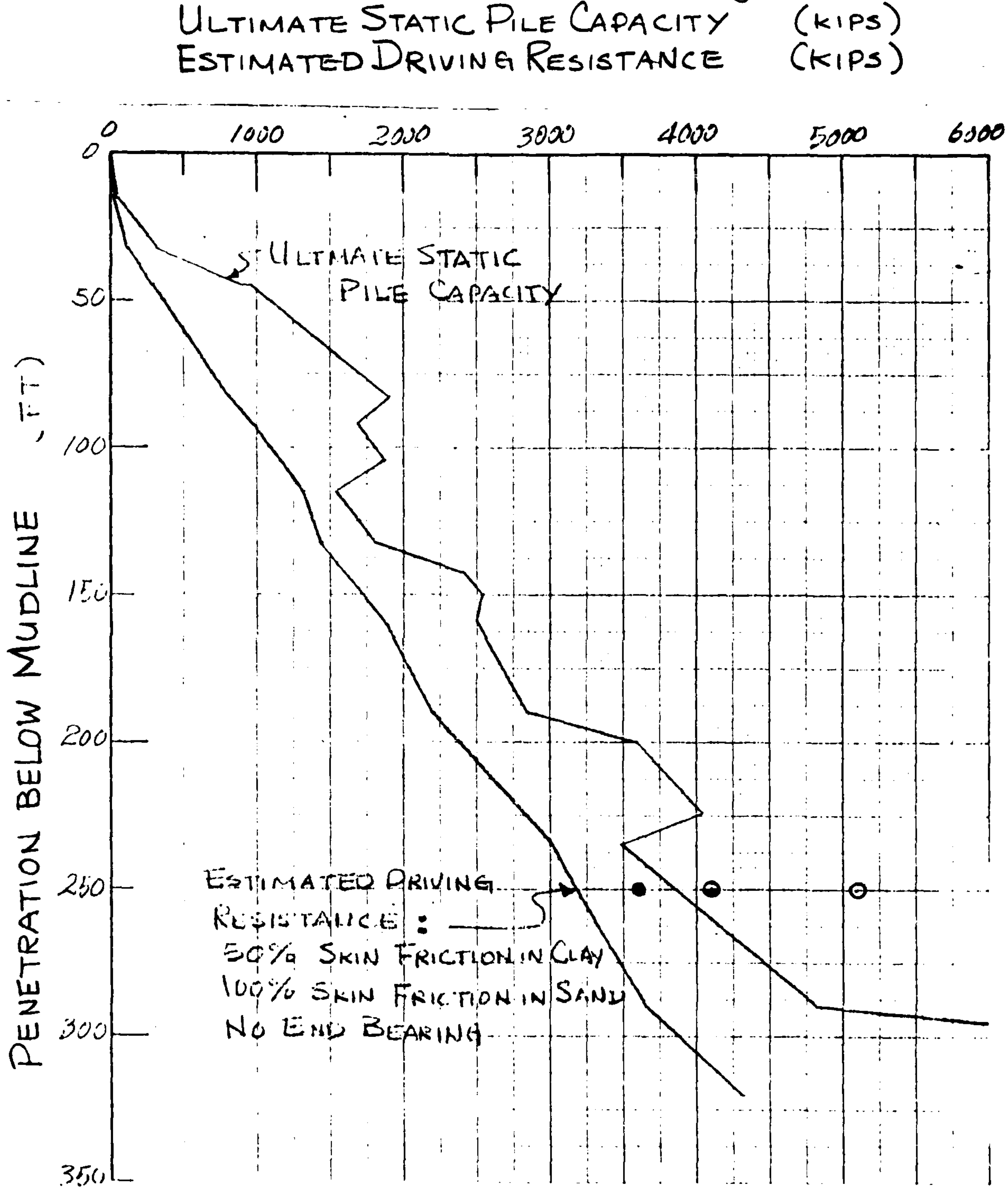
(Boring #1)

42-in. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 55B of 66

By C. Cherry Client U.S. NAVY Subject Foundation Analysis
Date 6-28-76 Job No. 27-271-97 Calculation Pile Driving Resistance Curves



2-in Uniform Wall

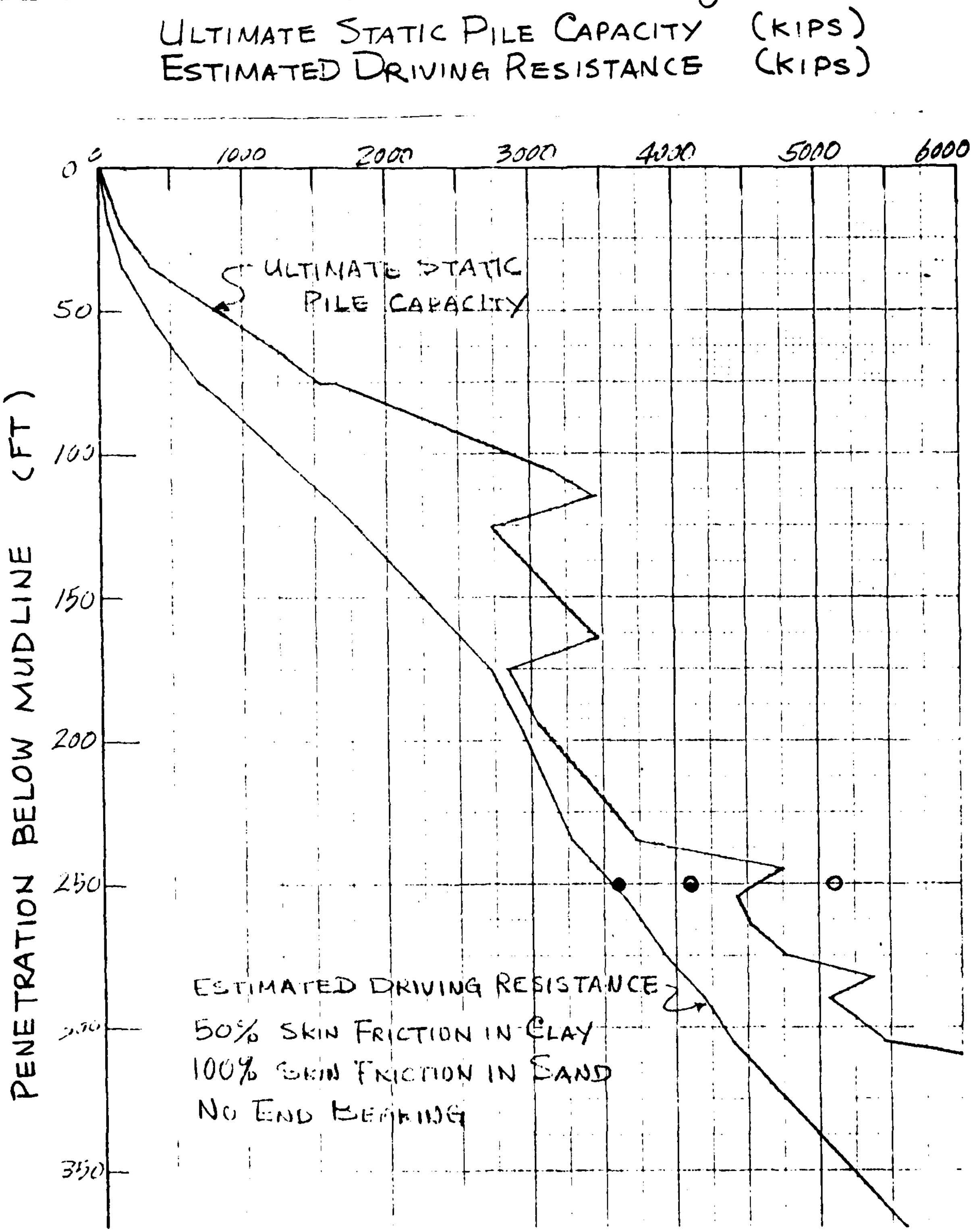
(Boring #2)

42 IN DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 149 of 66

By C. Chen Client U.S. NAVY Subject Foundation Analysis
Date 6-28-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



2-in. Uniform Wall

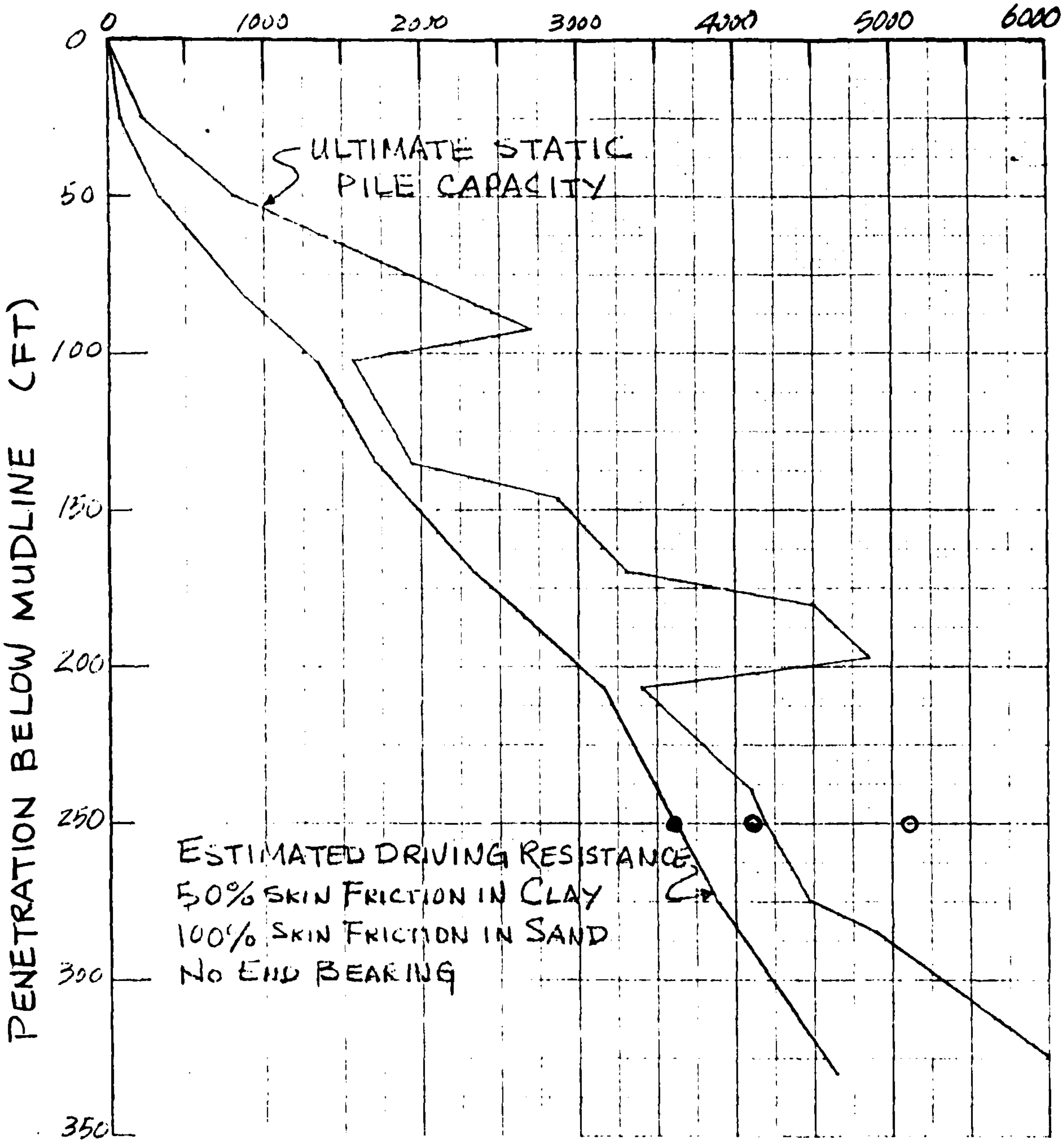
(Boring #3A)
42-IN. DIAMETER PIPE PILES

CREST OFFSHORE, INC.

Sheet 3.60 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 6-28-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)
ESTIMATED DRIVING RESISTANCE (KIPS)



2-in. Uniform Wall

(Boring #4)

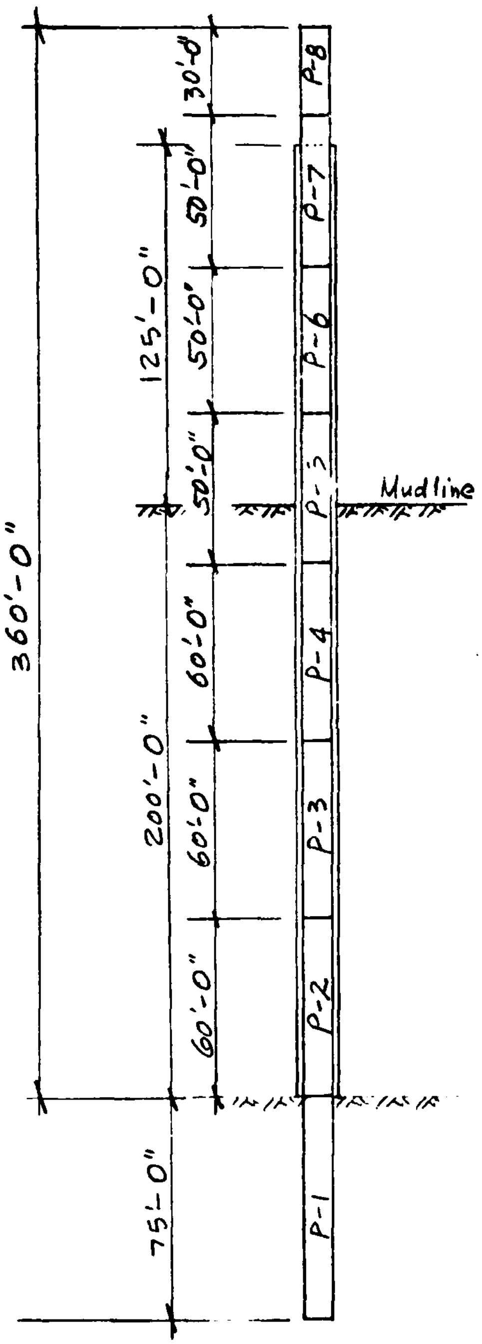
42-in. DIAMETER PIPE PILES

3.7 33 IN. DIAMETER INSERTED PILING

CRESTOFFSHORE, INC.

Sheet 3-62 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

42"φ Piling at 200 FT Penetration

33"φ Piling at 75 FT Penetration

Vulcan 040 Hammer
Wt. of Ram = 40,000 lbs
Rated Energy = 120,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 27,800 lbs

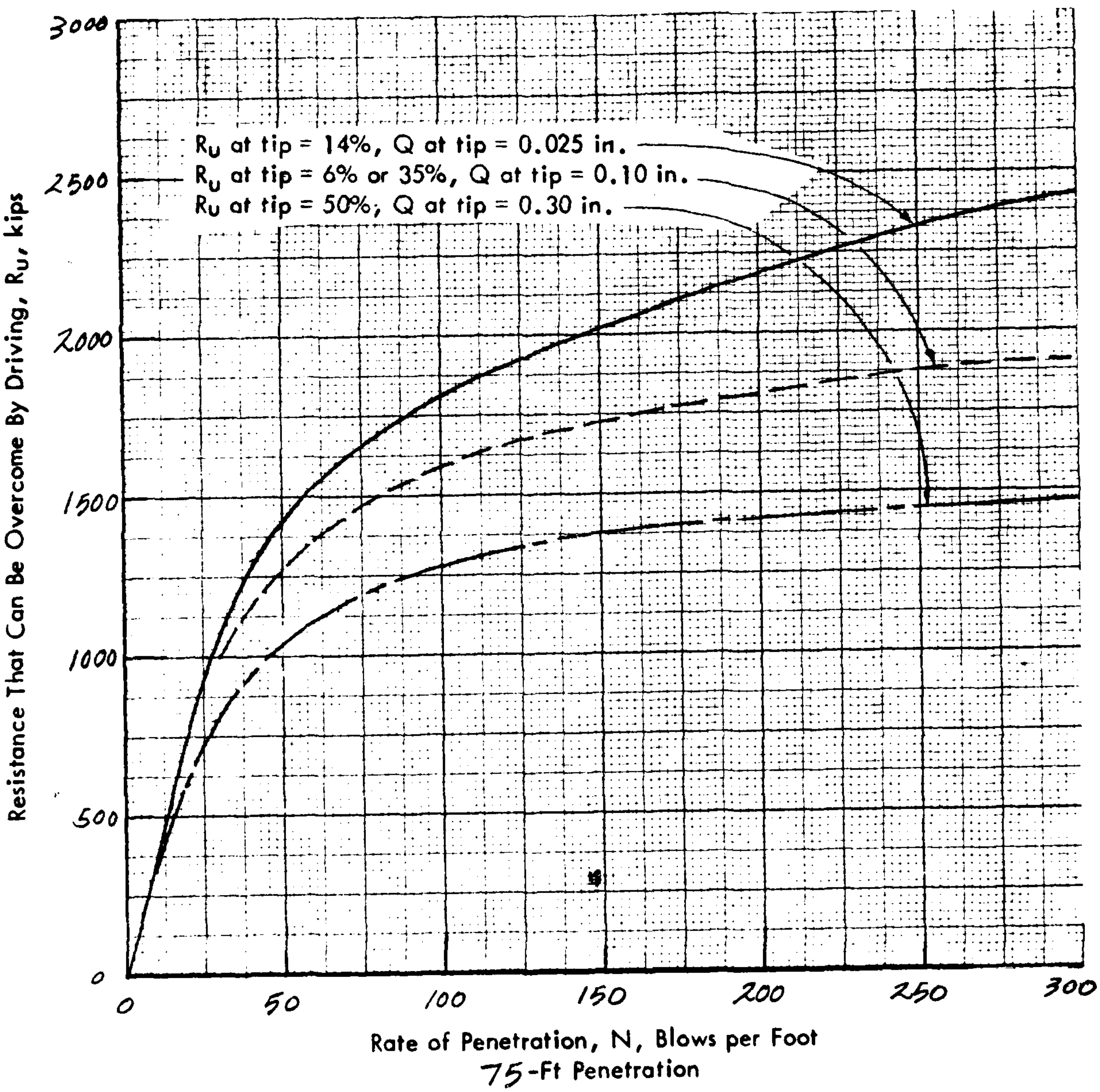
Spring Constant = 2.78×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10 in.
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3-63 of 66

By C. Chern Client U.S. NAVY Subject Foundation Analysis

Date 8-26-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

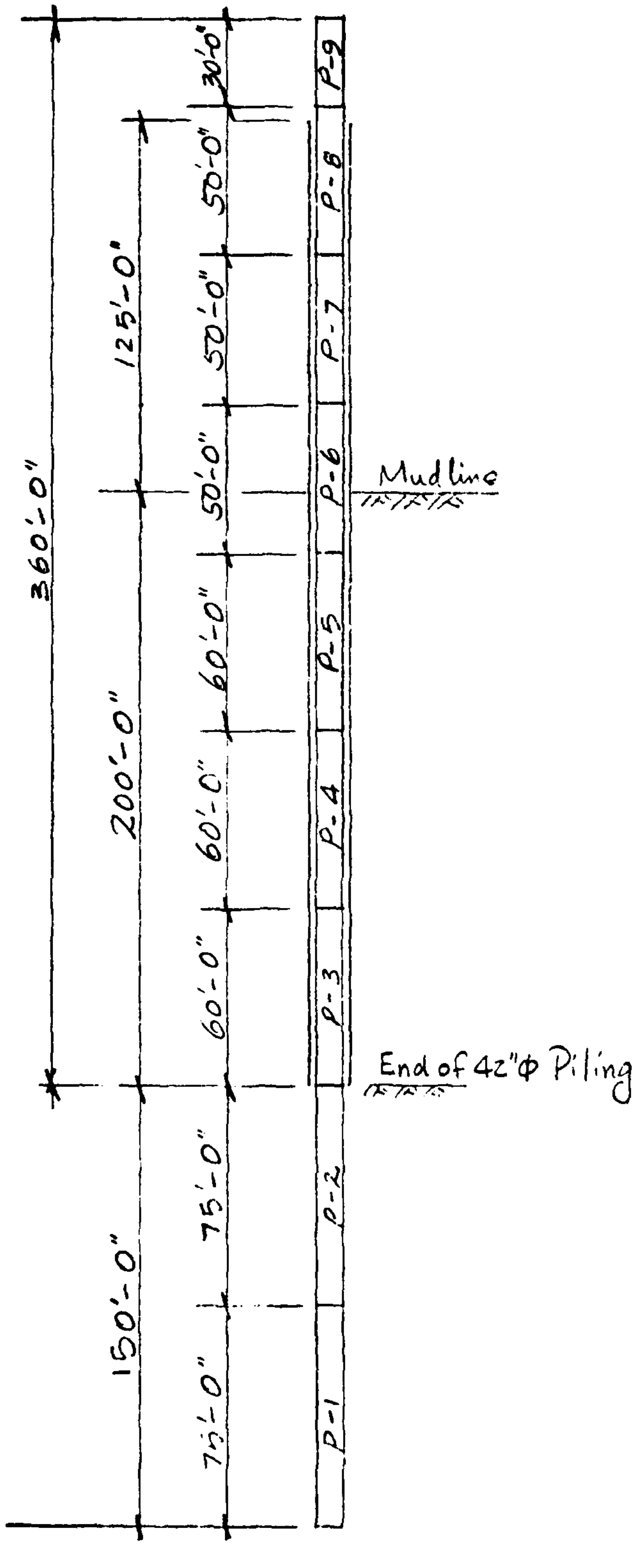


33-IN. DIAMETER INSERTED PILING

CREST OFFSHORE, INC.

Sheet 3-64 of 60

By C. Chern Client U.S. NAVY Subject Foundation Analysis
Date 8-25-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



MLW = 105'-0"

42"φ Piling at 200 FT Penetration

33"φ Piling at 150 FT Penetration

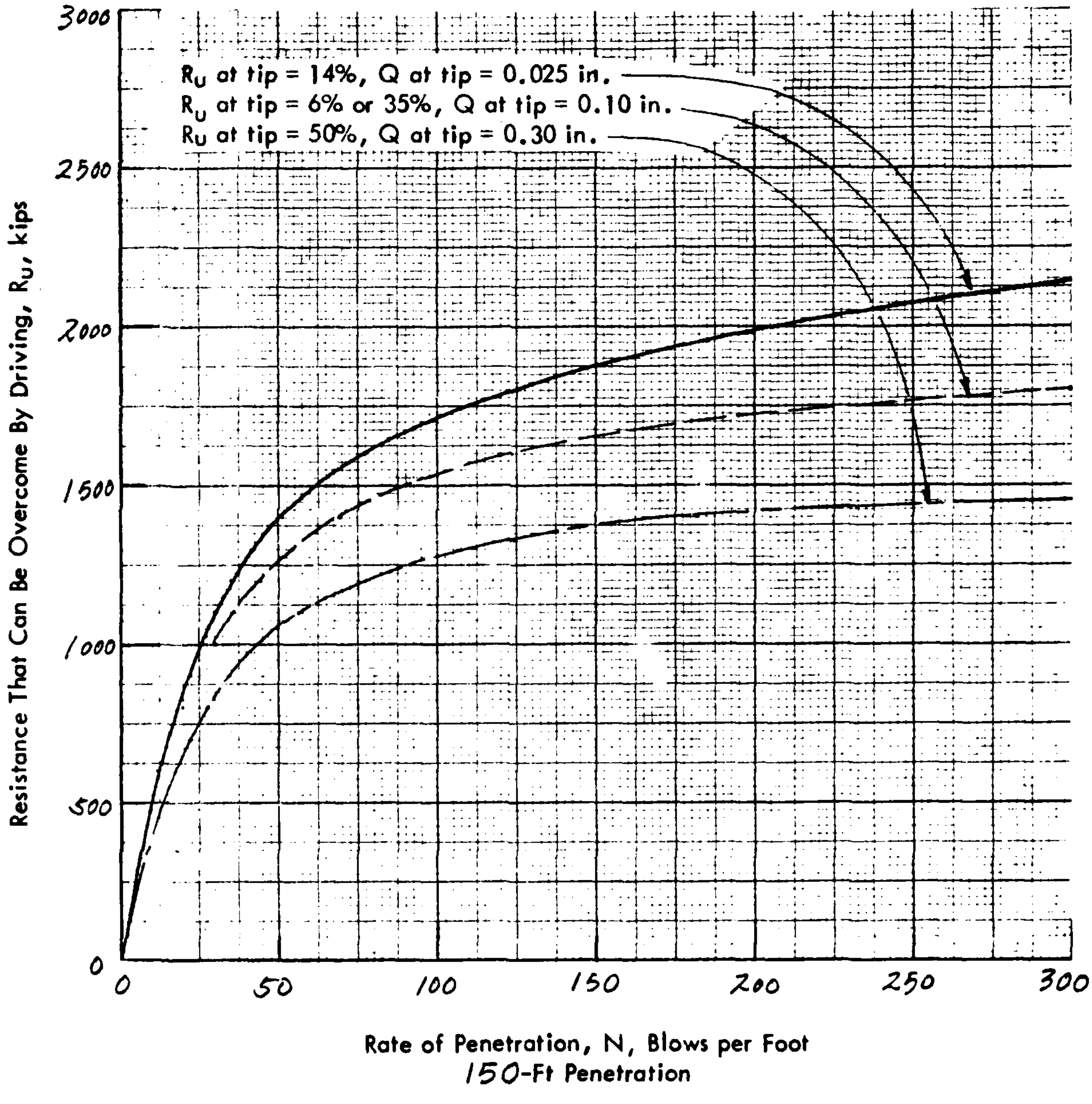
Vulcan 040 Hammer
Wt. of Ram = 40,000 lbs
Rated Energy = 120,000 ft-lbs
Hammer Efficiency = 0.75
Wt. of Pile Cap = 27,800 lbs

Spring Constant = 2.78×10^6 lbs/in.
Damping Factor, side & tip, J = 0.15
Quake Factor, side, Q = 0.10 in.
Quake Factor, tip, - See Above

CREST OFFSHORE, INC.

Sheet 3.62 of 66

By C. Chell Client U.S. NAVY Subject Foundation Analysis
Date 8-26-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves



33-IN. DIAMETER INSERTED PILING

CREST OFFSHORE, INC.

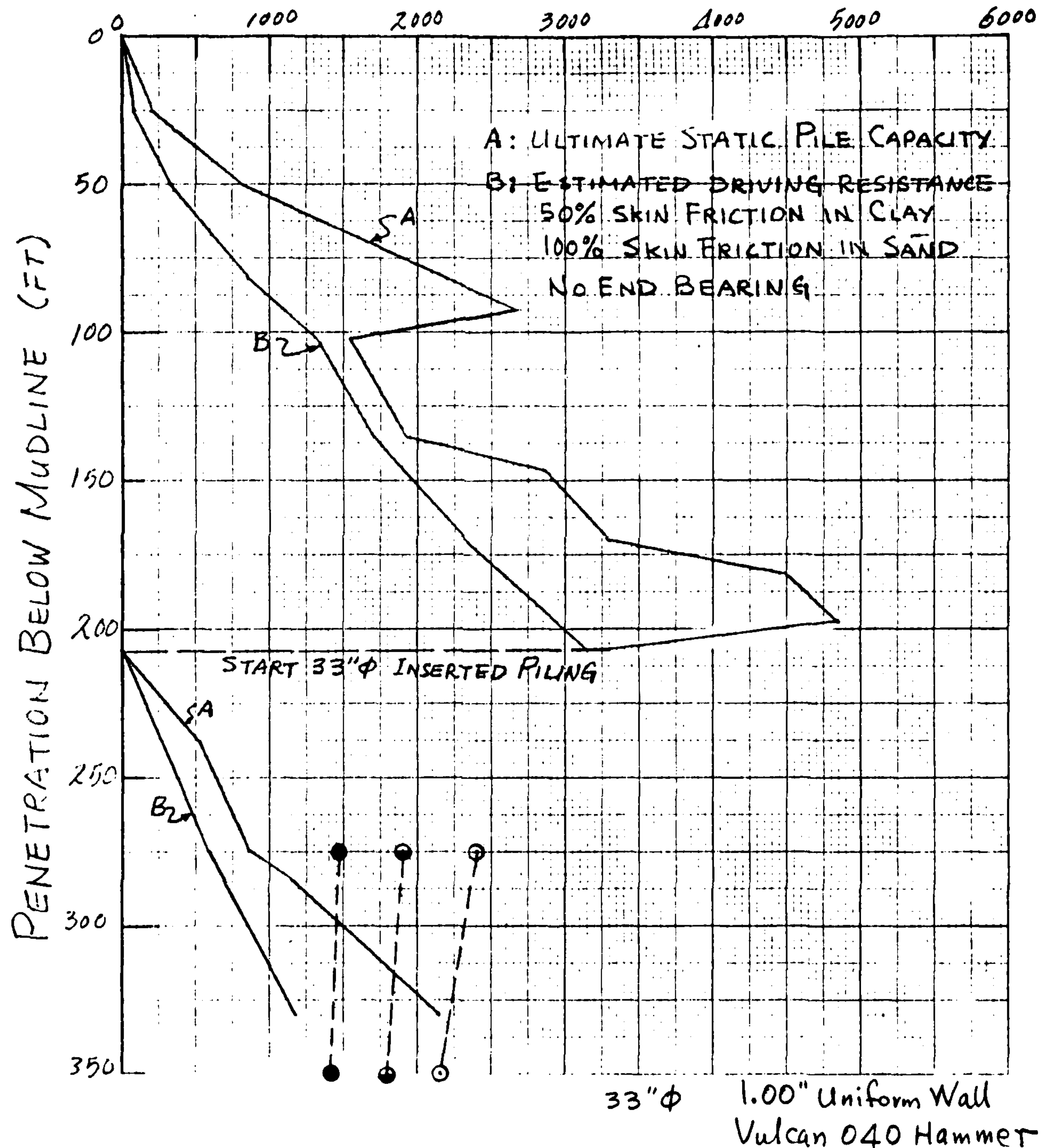
Sheet [illegible] of 66

By C. Cheris Client U.S. NAVY Subject Foundation Analysis

Date 8-26-76 Job No. 27-771-97 Calculation Pile Driving Resistance Curves

ULTIMATE STATIC PILE CAPACITY (KIPS)

ESTIMATED DRIVING RESISTANCE (KIPS)



42-IN. DIAMETER PIPE PILES (200 FT PENETRATION)

33-IN. DIAMETER INSERTED PILES

(Boring #4)

APPENDIX

STRESS-WAVE ANALYSIS

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	-1.25 in.
Penetration	- 150 ft.
	- 200 ft.
Hammer	- Vulcan 560
Quake Factor, Tip	- .42 in.

6 0 0 0 R E M O T E B A T C H

UNITED COMPUTING 67, APEX/SL B.6.0

09.15.06.   07/13/76.

```
PPPPPPPPPPP   UU        UU  YY        YY    OOOOOOOO    MM        MM   AAAAAAAAAA   NN        NN
PPPPPPPPPPPP  UU        UU  YY        YY   OO      OO   MMM      MMM  AAAAAAAAAAAA  NNN       NN
PP        PP  UU        UU  YY        YY  OO        OO  MMMM    MMMM  AA        AA  NNNN      NN
PP        PP  UU        UU  YY        YY  OO        OO  MM MM  MM MM  AA        AA  NN NN     NN
PP        PP  UU        UU  YY        YY  OO        OO  MM  MMMM  MM  AA        AA  NN  NN    NN
PP        PP  UU        UU  YY        YY  OO        OO  MM   MM   MM  AA        AA  NN   NN   NN
PPPPPPPPPPPP  UU        UU  YYY      YYY  OO        OO  MM        MM  AA        AA  NN    NN  NN
PPPPPPPPPPP   UU        UU   YYY    YYY   OO        OO  MM        MM  AA        AA  NN     NN NN
PP            UU        UU    YYY  YYY    OO        OO  MM        MM  AAAAAAAAAAAA  NN      NNNN
PP            UU        UU     YYYY       OO        OO  MM        MM  AAAAAAAAAAAA  NN       NNN
PP            UU        UU      YY        OO        OO  MM        MM  AA        AA  NN        NN
PP            UU        UU      YY        OO        OO  MM        MM  AA        AA  NN        NN
PP            UU        UU      YY        OO        OO  MM        MM  AA        AA  NN        NN
PP            UU        UU      YY        OO        OO  MM        MM  AA        AA  NN        NN
PP            UUUUUUUUUUUU      YY         OO      OO   MM        MM  AA        AA  NN        NN
PP             UUUUUUUUUU       YY          OOOOOOOO    MM        MM  AA        AA  NN        NN
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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
13 JULY 1976

PROB	
1	42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES 150FT PENETRATION -- VULCAN 560 HAMMER QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 6

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .42

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,420,MINIMUM WALL THICKNESS=1,25 IN, RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN,	WEIGHT LBS	AREA SG,IN,	COEF RSTITU	SPR STIFF LBS/IN,
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	46122615,
3	160,00	0,00	6494,28	190,85	1,00	46122615,
4	150,00	0,00	6494,28	190,85	1,00	46122615,
5	140,00	0,00	6494,28	190,85	1,00	46122615,
6	130,00	0,00	6274,91	221,29	1,00	64173070,
7	121,67	0,00	6274,91	221,29	1,00	64173070,
8	113,33	0,00	6274,91	221,29	1,00	64173070,
9	105,00	0,00	6274,91	221,29	1,00	64173070,
10	96,67	0,00	6274,91	221,29	1,00	64173070,
11	88,33	0,00	6274,91	221,29	1,00	64173070,
12	80,00	0,00	6274,91	221,29	1,00	64173070,
13	71,67	0,00	6274,91	221,29	1,00	64173070,
14	63,33	0,00	6274,91	221,29	1,00	64173070,
15	55,00	0,00	6274,91	221,29	1,00	64173070,
16	46,67	0,00	6274,91	221,29	1,00	64173070,
17	38,33	0,00	6274,91	221,29	1,00	64173070,
18	30,00	0,00	5411,90	190,85	1,00	55347138,
19	21,67	0,00	5411,90	190,85	1,00	55347138,
20	13,33	0,00	5411,90	190,85	1,00	55347138,
21	5,00	0,00	5411,90	190,85	1,00	55347138,
22	-3,33	0,00	5411,90	190,85	1,00	55347138,
23	-11,67	0,00	5411,90	190,85	1,00	55347138,
24	-20,00	0,00	5411,90	190,85	1,00	55347138,
25	-28,33	0,00	5411,90	190,85	1,00	55347138,
26	-36,67	0,00	5411,90	190,85	1,00	55347138,
27	-45,00	0,00	5411,90	190,85	1,00	55347138,
28	-53,33	0,00	5411,90	190,85	1,00	55347138,
29	-61,67	0,00	5411,90	190,85	1,00	55347138,
30	-70,00	0,00	4840,27	160,03	1,00	43506865,
31	-78,89	0,00	4840,27	160,03	1,00	43506865,
32	-87,78	0,00	4840,27	160,03	1,00	43506865,
33	-96,67	0,00	4840,27	160,03	1,00	43506865,
34	-105,56	0,00	4840,27	160,03	1,00	43506865,
35	-114,44	0,00	4840,27	160,03	1,00	43506865,
36	-123,33	0,00	4840,27	160,03	1,00	43506865,
37	-132,22	0,00	4840,27	160,03	1,00	43506865,
38	-141,11	1000,00	4840,27	160,03	1,00	43506865,

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,420,MINIMUM WALL THICKNESS=1,25 IN, RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50,00

PERMANENT SET OF PILE = ,0348 INCHES
NUMBER OF BLOWS PER FOOT = 345,12
TOTAL INTERVALS = 161

SEC	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4071754,	25	0,	123	1,000	1,554639	1,554639	-,06
2	0,00	3158208,	35	0,	0	1,000	1,121334	1,087106	-,79
3	160,00	16846,	37	0,	0	190,852	1,099393	1,059179	-,96
4	150,00	17112,	40	0,	0	190,852	1,088618	1,043044	-1,11
5	140,00	17291,	42	0,	0	190,852	1,076545	1,026618	-1,22
6	130,00	14934,	44	0,	0	221,286	1,063280	1,010226	-1,28
7	121,67	14966,	47	0,	0	221,286	1,053037	,998378	-1,30
8	113,33	14997,	49	0,	0	221,286	1,042098	,986354	-1,32
9	105,00	15024,	51	0,	0	221,286	1,030643	,973981	-1,38
10	96,67	15034,	53	0,	0	221,286	1,018909	,960985	-1,44
11	88,33	14988,	55	0,	0	221,286	1,007324	,947221	-1,47
12	80,00	14855,	57	0,	0	221,286	,995401	,932812	-1,45
13	71,67	14682,	59	0,	0	221,286	,982834	,917963	-1,38
14	63,33	14505,	61	0,	0	221,286	,969671	,902775	-1,30
15	55,00	14334,	63	0,	0	221,286	,957252	,887065	-1,28
16	46,67	14221,	66	0,	0	221,286	,948126	,870440	-1,32
17	38,33	14182,	68	0,	0	221,286	,938689	,852599	-1,38
18	30,00	16509,	70	0,	0	190,852	,928621	,833532	-1,39
19	21,67	16631,	73	0,	0	190,852	,916212	,810637	-1,35
20	13,33	16794,	75	0,	0	190,852	,902908	,787546	-1,29
21	5,00	16998,	77	0,	0	190,852	,888388	,764379	-1,24
22	-3,33	17173,	79	0,	0	190,852	,872397	,741257	-1,14
23	-11,67	17230,	82	0,	0	190,852	,854880	,718679	-,99
24	-20,00	17141,	84	0,	0	190,852	,835721	,696917	-,89
25	-28,33	16972,	86	0,	0	190,852	,814918	,675524	-,83
26	-36,67	16753,	88	0,	0	190,852	,792811	,654137	-,74
27	-45,00	16412,	91	0,	0	190,852	,770478	,632879	-,60
28	-53,33	16111,	93	0,	0	190,852	,748483	,611739	-,46
29	-61,67	15803,	96	0,	0	190,852	,725749	,590544	-,33
30	-70,00	18455,	98	0,	0	160,025	,702022	,569385	-,22
31	-78,89	17824,	100	0,	0	160,025	,672609	,542560	-,13
32	-87,78	16848,	101	0,	0	160,025	,644392	,515845	-,08
33	-96,67	15627,	104	0,	0	160,025	,614835	,489399	-,06
34	-105,56	14855,	107	0,	0	160,025	,583518	,463411	-,08
35	-114,44	13945,	109	0,	0	160,025	,551341	,437978	-,11
36	-123,33	12807,	115	0,	0	160,025	,517923	,413231	-,17
37	-132,22	12484,	116	0,	0	160,025	,485540	,389254	-,24
38	-141,11	12164,	119	0,	0	160,025	,454771	,366224	-,30

PROB 1 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.73	50.	95.97	17341.	30	15286.	30
2.48	100.	184.35	17903.	30	13417.	30
3.43	150.	265.41	18168.	30	11658.	30
4.64	200.	339.39	18197.	30	10023.	30
6.14	250.	407.34	18217.	30	8492.	30
7.97	300.	469.64	18234.	30	7052.	30
9.88	350.	526.80	18256.	30	5737.	30
12.12	400.	579.43	18276.	30	4541.	30
14.86	450.	628.04	18294.	30	3439.	30
17.93	500.	672.95	18310	30	2420.	30
19.89 ✓	550.	714.46	18326.	30	1464.	30
22.11	600.	752.65	18341.	30	641.	7
24.65	650.	787.67	18354.	30	143.	6
27.58	700.	819.48	18365.	30	0.	38
31.00 ✓	750.	847.91	18375.	30	0.	38
35.05	800.	873.56	18385.	30	0.	38
39.90 ✓	850.	896.93	18394.	30	0.	38
45.81	900.	929.79	18402.	30	0.	38
53.11 ✓	950.	953.79	18409.	30	0.	38
62.38 ✓	1000.	972.28	18414.	30	0.	38
74.53 ✓	1050.	984.84	18418.	30	0.	38
91.06 ✓	1100.	992.67	18424.	30	0.	38
114.58 ✓	1150.	997.65	18433.	30	0.	38
150.84 ✓	1200.	994.57	18441.	30	0.	38
213.58 ✓	1250.	984.47	18448.	30	0.	38
345.12 ✓	1300.	973.26	18455.	30	0.	38

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,420,MINIMUM WALL THICKNESS=1,25 IN, RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50,00

BLOWS PER FOOT	RESISTANCE TONS
150,84	1200,
213,58	1250,
239,61	1264,
286,15	1283,

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
13 JULY 1976

PROB	
2	42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES 200FT PENETRATION -- VULCAN 560 HAMMER QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1	
NEW HAMMER DATA OPTION	1	
NEW MATERIAL DATA OPTION	1	
NEW PILE SECTION DATA OPTION	1	
NEW SOIL DATA OPTION	1	
SPECIFIED BLOW COUNT OPTION	1	
OUTPUT OPTION FOR STRESS	1	
BPF FOR STRESS OUTPUT OPTION		275.
ULTIMATE RESISTANCE INCREMENT (TONS)		50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)		300.
SPECIFIED SEGMENT LENGTH (FT)		-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 7

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	50.	230	280
7	1	1.250	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .42

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	46122615.
3	160.00	0.00	6494.28	190.85	1.00	46122615.
4	150.00	0.00	6494.28	190.85	1.00	46122615.
5	140.00	0.00	6494.28	190.85	1.00	46122615.
6	130.00	0.00	6274.91	221.29	1.00	64173070.
7	121.67	0.00	6274.91	221.29	1.00	64173070.
8	113.33	0.00	6274.91	221.29	1.00	64173070.
9	105.00	0.00	6274.91	221.29	1.00	64173070.
10	96.67	0.00	6274.91	221.29	1.00	64173070.
11	88.33	0.00	6274.91	221.29	1.00	64173070.
12	80.00	0.00	6274.91	221.29	1.00	64173070.
13	71.67	0.00	6274.91	221.29	1.00	64173070.
14	63.33	0.00	6274.91	221.29	1.00	64173070.
15	55.00	0.00	6274.91	221.29	1.00	64173070.
16	46.67	0.00	6274.91	221.29	1.00	64173070.
17	38.33	0.00	6274.91	221.29	1.00	64173070.
18	30.00	0.00	5411.90	190.85	1.00	55347138.
19	21.67	0.00	5411.90	190.85	1.00	55347138.
20	13.33	0.00	5411.90	190.85	1.00	55347138.
21	5.00	0.00	5411.90	190.85	1.00	55347138.
22	-3.33	0.00	5411.90	190.85	1.00	55347138.
23	-11.67	0.00	5411.90	190.85	1.00	55347138.
24	-20.00	0.00	5411.90	190.85	1.00	55347138.
25	-28.33	0.00	5411.90	190.85	1.00	55347138.
26	-36.67	0.00	5411.90	190.85	1.00	55347138.
27	-45.00	0.00	5411.90	190.85	1.00	55347138.
28	-53.33	0.00	5411.90	190.85	1.00	55347138.
29	-61.67	0.00	5411.90	190.85	1.00	55347138.
30	-70.00	0.00	4537.75	160.03	1.00	46407322.
31	-78.33	0.00	4537.75	160.03	1.00	46407322.
32	-86.67	0.00	4537.75	160.03	1.00	46407322.
33	-95.00	0.00	4537.75	160.03	1.00	46407322.
34	-103.33	0.00	4537.75	160.03	1.00	46407322.
35	-111.67	0.00	4537.75	160.03	1.00	46407322.
36	-120.00	0.00	4840.27	160.03	1.00	43506865.
37	-128.89	0.00	4840.27	160.03	1.00	43506865.
38	-137.78	0.00	4840.27	160.03	1.00	43506865.
39	-146.67	0.00	4840.27	160.03	1.00	43506865.
40	-155.56	0.00	4840.27	160.03	1.00	43506865.
41	-164.44	0.00	4840.27	160.03	1.00	43506865.
42	-173.33	0.00	4840.27	160.03	1.00	43506865.
43	-182.22	0.00	4840.27	160.03	1.00	43506865.
44	-191.11	1000.00	4840.27	160.03	1.00	43506865.

PROB 2 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0307 INCHES
NUMBER OF BLOWS PER FOOT = 391.40
TOTAL INTERVALS = 175

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4071900.	25	0.	127	1.000	1.605257	1.605257	-.03
2	0.00	3156646.	35	0.	0	1.000	1.168995	1.162673	-.51
3	160.00	16854.	38	0.	0	190.852	1.148673	1.133133	-.65
4	150.00	17101.	41	0.	0	190.852	1.142620	1.115368	-.79
5	140.00	17296.	43	0.	0	190.852	1.136195	1.096983	-.94
6	130.00	14943.	45	0.	0	221.286	1.128905	1.078225	-1.10
7	121.67	14967.	47	0.	0	221.286	1.122802	1.064603	-1.21
8	113.33	14988.	50	0.	0	221.286	1.115721	1.050893	-1.29
9	105.00	15019.	52	0.	0	221.286	1.107507	1.037225	-1.34
10	96.67	15031.	54	0.	0	221.286	1.098143	1.023776	-1.38
11	88.33	14985.	56	0.	0	221.286	1.087652	1.010634	-1.36
12	80.00	14852.	58	0.	0	221.286	1.076286	.997852	-1.30
13	71.67	14681.	60	0.	0	221.286	1.064327	.985469	-1.22
14	63.33	14506.	62	0.	0	221.286	1.052248	.973440	-1.15
15	55.00	14337.	64	0.	0	221.286	1.040204	.961602	-1.11
16	46.67	14217.	67	0.	0	221.286	1.027592	.949630	-1.10
17	38.33	14174.	69	0.	0	221.286	1.014260	.937195	-1.11
18	30.00	16481.	71	0.	0	190.852	1.000543	.924153	-1.09
19	21.67	16558.	74	0.	0	190.852	.986173	.908496	-1.01
20	13.33	16663.	76	0.	0	190.852	.974794	.892460	-.91
21	5.00	16786.	78	0.	0	190.852	.964102	.876070	-.83
22	-3.33	16883.	80	0.	0	190.852	.952993	.859066	-.80
23	-11.67	16882.	82	0.	0	190.852	.940976	.840953	-.85
24	-20.00	16750.	84	0.	0	190.852	.927527	.821469	-.92
25	-28.33	16561.	87	0.	0	190.852	.912420	.800770	-.95
26	-36.67	16360.	89	0.	0	190.852	.895520	.779312	-.92
27	-45.00	16098.	91	0.	0	190.852	.876932	.757530	-.90
28	-53.33	15894.	94	0.	0	190.852	.856752	.735519	-.90
29	-61.67	15745.	96	0.	0	190.852	.835130	.713493	-.85
30	-70.00	18609.	99	0.	0	160.025	.812303	.691861	-.75
31	-78.33	18395.	101	0.	0	160.025	.784511	.666439	-.67
32	-86.67	18137.	103	0.	0	160.025	.757013	.641018	-.63
33	-95.00	17825.	105	0.	0	160.025	.731428	.615393	-.54
34	-103.33	17474.	108	0.	0	160.025	.708925	.589881	-.41
35	-111.67	17070.	110	0.	0	160.025	.687304	.564697	-.32
36	-120.00	16039.	112	0.	0	160.025	.665327	.539897	-.27
37	-126.89	16043.	114	0.	0	160.025	.642417	.513969	-.22
33	-137.78	15131.	115	0.	0	160.025	.620131	.488746	-.23

40	-155.56	13329.	122	0.	0	160.025	.569271	.440111	-.27
41	-164.4[illegible]	12757.	124	0.	0	160.[illegible]	.541129	.416821	-.33
42	-173.33	11901.	129	0.	0	160.	.511016	.394294	-.40
43	-182.22	12022.	130	0.	0	160.025	.480534	.372553	-.48
44	-191.11	12061.	133	0.	0	160.025	.450659	.351573	-.56

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.55	50.	96.18	17291.	5	14985.	32
2.26	100.	184.86	17852.	32	13119.	33
3.25	150.	266.49	18295.	30	11422.	33
4.52	200.	340.78	18321.	30	9824.	33
5.81	250.	408.99	18343.	30	8340.	34
7.52	300.	471.61	18361.	30	6992.	18
9.31	350.	528.96	18378.	30	5824.	18
11.40	400.	581.55	18394.	30	4724.	18
14.00	450.	629.91	18409.	30	3705.	35
17.19	500.	674.65	18423.	30	2761.	35
19.12	550.	715.95	18438.	30	1906.	7
21.31	600.	753.69	18452.	30	1264.	7
23.82	650.	788.47	18465.	30	684.	7
26.74	700.	820.13	18477.	30	257.	3
30.16	750.	848.67	18489.	30	0.	44
34.20	800.	873.82	18502.	30	0.	44
39.07	850.	896.28	18513.	30	0.	44
45.03	900.	921.92	18525.	30	0.	44
52.45	950.	944.52	18536.	30	0.	44
61.95	1000.	965.34	18547.	30	0.	44
74.50	1050.	983.96	18556.	30	0.	44
91.78	1100.	994.36	18566.	30	0.	44
116.87	1150.	996.06	18575.	30	0.	44
156.37	1200.	989.42	18585.	30	0.	44
227.65	1250.	977.52	18597.	30	0.	44
391.40	1300.	965.00	18609.	30	0.	44

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
156.37	1200.
194.37	1231.
227.65	1250.
280.63	1272.

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	-1.50 in.
Penetration	- 150 ft.
	- 200 ft.
Hammer	- Vulcan 560
Quake Factor, Tip	- .42 in.

7

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UNITED COMPUTING 67, APEX/SL B,6,0

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PP        PP  UU        UU  YY        YY  00        00  LL             LL           CC
PPPPPPPPPPPP  UU        UU  YYY      YYY  00        00  LL             LL           CC
PPPPPPPPPPP   UU        UU   YYY    YYY   00        00  LL             LL           CC
PP            UU        UU    YYY  YYY    00        00  LL             LL           CC
PP            UU        UU      YYYY      00        00  LL             LL           CC
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PP            UUUUUUUUUUUU       YY        00      00   LLLLLLLLLLLL   LLLLLLLLLLLL CCCCCCCCCCCC
PP             UUUUUUUUUU        YY         00000000    LLLLLLLLLLLL   LLLLLLLLLLLL  CCCCCCCCCC
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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
13 JULY 1976

PROB
1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.420,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1	
NEW HAMMER DATA OPTION	1	
NEW MATERIAL DATA OPTION	1	
NEW PILE SECTION DATA OPTION	1	
NEW SOIL DATA OPTION	1	
SPECIFIED BLOW COUNT OPTION	1	
OUTPUT OPTION FOR STRESS	1	
BPF FOR STRESS OUTPUT OPTION		275.
ULTIMATE RESISTANCE INCREMENT (TONS)		50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)		300.
SPECIFIED SEGMENT LENGTH (FT)		-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 6

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .42

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5772.69	190.85	1.00	51887942.
31	-78.89	0.00	5772.69	190.85	1.00	51887942.
32	-87.78	0.00	5772.69	190.85	1.00	51887942.
33	-96.67	0.00	5772.69	190.85	1.00	51887942.
34	-105.56	0.00	5772.69	190.85	1.00	51887942.
35	-114.44	0.00	5772.69	190.85	1.00	51887942.
36	-123.33	0.00	5772.69	190.85	1.00	51887942.
37	-132.22	0.00	5772.69	190.85	1.00	51887942.
38	-141.11	1000.00	5772.69	190.85	1.00	51887942.

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

GTIP=.420,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0371 INCHES
NUMBER OF BLOWS PER FOOT = 323.88
TOTAL INTERVALS = 156

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4126428.	25	0.	121	1.000	1.433027	1.433027	-.04
2	0.00	3392390.	34	0.	0	1.000	1.001405	.965276	-.82
3	160.00	15587.	37	0.	0	221.286	.981987	.941531	-.97
4	150.00	15795.	39	0.	0	221.286	.973057	.928969	-1.11
5	140.00	15950.	42	0.	0	221.286	.963065	.915844	-1.22
6	130.00	14073.	44	0.	0	251.328	.952055	.902171	-1.25
7	121.67	14100.	46	0.	0	251.328	.943467	.892027	-1.24
8	113.33	14126.	48	0.	0	251.328	.934650	.881883	-1.21
9	105.00	14150.	50	0.	0	251.328	.926030	.871704	-1.17
10	96.67	14162.	52	0.	0	251.328	.917226	.861346	-1.16
11	88.33	14130.	54	0.	0	251.328	.907966	.850531	-1.18
12	80.00	14025.	56	0.	0	251.328	.898404	.838965	-1.19
13	71.67	13883.	58	0.	0	251.328	.891773	.826596	-1.17
14	63.33	13742.	60	0.	0	251.328	.886179	.813610	-1.11
15	55.00	13619.	63	0.	0	251.328	.880181	.800239	-1.03
16	46.67	13537.	65	0.	0	251.328	.873478	.786538	-.97
17	38.33	13509.	67	0.	0	251.328	.865887	.772280	-.99
18	30.00	15407.	70	0.	0	221.286	.857330	.757144	-1.08
19	21.67	15518.	72	0.	0	221.286	.846581	.738893	-1.18
20	13.33	15665.	74	0.	0	221.286	.834808	.719724	-1.23
21	5.00	15850.	76	0.	0	221.286	.822015	.700190	-1.22
22	-3.33	16012.	78	0.	0	221.286	.807922	.680639	-1.23
23	-11.67	16076.	81	0.	0	221.286	.792398	.661057	-1.22
24	-20.00	16013.	83	0.	0	221.286	.775399	.641621	-1.13
25	-28.33	15876.	85	0.	0	221.286	.756794	.622628	-1.02
26	-36.67	15701.	87	0.	0	221.286	.737080	.603813	-.95
27	-45.00	15423.	89	0.	0	221.286	.717127	.584680	-.89
28	-53.33	15174.	92	0.	0	221.286	.698183	.565411	-.79
29	-61.67	14904.	94	0.	0	221.286	.679372	.546383	-.69
30	-70.00	16931.	96	0.	0	190.852	.659921	.527621	-.62
31	-78.89	16391.	98	0.	0	190.852	.636183	.504745	-.54
32	-87.78	15481.	100	0.	0	190.852	.613941	.482454	-.50
33	-96.67	14268.	102	0.	0	190.852	.590872	.460670	-.50
34	-105.56	13445.	106	0.	0	190.852	.565858	.439390	-.51
35	-114.44	12656.	107	0.	0	190.852	.539593	.418695	-.53
36	-123.33	11523.	113	0.	0	190.852	.511691	.398502	-.55
37	-132.22	11294.	114	0.	0	190.852	.483969	.378969	-.59
38	-141.11	11074.	117	0.	0	190.852	.457051	.360250	-.67

PRGB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

GTIP=,420,MINIMUM WALL THICKNESS=1,50 IN, RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50,00

BLOWS/FT,	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ,IN,	SEG NO,	MAX T STRESS LBS/SQ,IN,	SEG NO,
1,75	50,	90,99	15942,	5	14603,	30
2,52	100,	175,78	16374,	30	13117,	30
3,43	150,	254,76	16729,	30	11718,	30
4,52	200,	327,74	16756,	30	10374,	30
5,95	250,	395,58	16773,	30	9119,	30
7,53	300,	458,65	16786,	30	7916,	30
9,46	350,	517,22	16797,	30	6804,	30
11,34	400,	571,70	16807,	30	5787,	30
13,66	450,	622,80	16816,	30	4846,	30
16,46	500,	670,53	16827,	30	3956,	30
19,77	550,	715,03	16839,	30	3113,	30
21,74	600,	756,46	16851,	30	2316,	30
23,93	650,	794,73	16861,	30	1571,	30
26,40	700,	830,67	16870,	30	858,	30
29,23	750,	863,78	16879,	30	168,	30
32,46	800,	894,06	16887,	30	0,	38
36,22	850,	921,86	16895,	30	0,	38
40,64	900,	950,26	16902,	30	0,	38
45,87	950,	978,78	16908,	30	0,	38
52,18	1000,	1002,58	16913,	30	0,	38
59,97	1050,	1033,47	16917,	30	0,	38
69,69	1100,	1051,55	16921,	30	0,	38
82,29	1150,	1062,27	16924,	30	0,	38
99,00	1200,	1070,71	16926,	30	0,	38
122,53	1250,	1077,14	16929,	30	0,	38
157,23	1300,	1074,76	16930,	30	0,	38
214,75	1350,	1066,09	16931,	30	0,	38
323,88	1400,	1056,75	16931,	30	0,	38

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
157.23	1300.
214.75	1350.
241.68	1366.
323.88	1400.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
13 JULY 1976

PROB
2 42-IN. DIAMETER PILES ML=-105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.420,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 7

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE - JSIDE .15
POINT DAMPENING RESISTANCE - JPONT .15
SOIL QUAKE FOR SIDE - QSIDE .10
SOIL QUAKE FOR POINT - QPOINT .42

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,420,MINIMUM WALL THICKNESS=1,50 IN, RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN,	WEIGHT LBS	AREA SQ,IN,	COEF RSTITU	SPR STIFF LBS/IN,
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	53477559,
3	160,00	0,00	7529,89	221,29	1,00	53477559,
4	150,00	0,00	7529,89	221,29	1,00	53477559,
5	140,00	0,00	7529,89	221,29	1,00	53477559,
6	130,00	0,00	7126,78	251,33	1,00	72885120,
7	121,67	0,00	7126,78	251,33	1,00	72885120,
8	113,33	0,00	7126,78	251,33	1,00	72885120,
9	105,00	0,00	7126,78	251,33	1,00	72885120,
10	96,67	0,00	7126,78	251,33	1,00	72885120,
11	88,33	0,00	7126,78	251,33	1,00	72885120,
12	80,00	0,00	7126,78	251,33	1,00	72885120,
13	71,67	0,00	7126,78	251,33	1,00	72885120,
14	63,33	0,00	7126,78	251,33	1,00	72885120,
15	55,00	0,00	7126,78	251,33	1,00	72885120,
16	46,67	0,00	7126,78	251,33	1,00	72885120,
17	38,33	0,00	7126,78	251,33	1,00	72885120,
18	30,00	0,00	6274,91	221,29	1,00	64173070,
19	21,67	0,00	6274,91	221,29	1,00	64173070,
20	13,33	0,00	6274,91	221,29	1,00	64173070,
21	5,00	0,00	6274,91	221,29	1,00	64173070,
22	-3,33	0,00	6274,91	221,29	1,00	64173070,
23	-11,67	0,00	6274,91	221,29	1,00	64173070,
24	-20,00	0,00	6274,91	221,29	1,00	64173070,
25	-28,33	0,00	6274,91	221,29	1,00	64173070,
26	-36,67	0,00	6274,91	221,29	1,00	64173070,
27	-45,00	0,00	6274,91	221,29	1,00	64173070,
28	-53,33	0,00	6274,91	221,29	1,00	64173070,
29	-61,67	0,00	6274,91	221,29	1,00	64173070,
30	-70,00	0,00	5411,90	190,85	1,00	55347138,
31	-78,33	0,00	5411,90	190,85	1,00	55347138,
32	-86,67	0,00	5411,90	190,85	1,00	55347138,
33	-95,00	0,00	5411,90	190,85	1,00	55347138,
34	-103,33	0,00	5411,90	190,85	1,00	55347138,
35	-111,67	0,00	5411,90	190,85	1,00	55347138,
36	-120,00	0,00	5772,69	190,85	1,00	51887942,
37	-128,89	0,00	5772,69	190,85	1,00	51887942,
38	-137,78	0,00	5772,69	190,85	1,00	51887942,
39	-146,67	0,00	5772,69	190,85	1,00	51887942,
40	-155,56	0,00	5772,69	190,85	1,00	51887942,
41	-164,44	0,00	5772,69	190,85	1,00	51887942,
42	-173,33	0,00	5772,69	190,85	1,00	51887942,
43	-182,22	0,00	5772,69	190,85	1,00	51887942,
44	-191,11	1000,00	5772,69	190,85	1,00	51887942,

PROB 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,420,MINIMUM WALL THICKNESS=1,50 IN, RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50,00

PERMANENT SET OF PILE = ,0362 INCHES
NUMBER OF BLOWS PER FOOT = 331,12
TOTAL INTERVALS = 168

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4125848,	25	0,	124	1,000	1,477369	1,477369	-,02
2	0,00	3392672,	35	0,	0	1,000	1,039889	1,031275	-,43
3	160,00	15590,	37	0,	0	221,286	1,023525	1,006860	-,58
4	150,00	15798,	40	0,	0	221,286	1,018644	,993608	-,75
5	140,00	15955,	42	0,	0	221,286	1,013252	,979649	-,92
6	130,00	14071,	44	0,	0	251,328	1,007090	,965133	-1,06
7	121,67	14093,	46	0,	0	251,328	1,001817	,954200	-1,16
8	113,33	14123,	49	0,	0	251,328	,995718	,943066	-1,25
9	105,00	14152,	51	0,	0	251,328	,988740	,931750	-1,32
10	96,67	14167,	53	0,	0	251,328	,980852	,920226	-1,36
11	88,33	14133,	55	0,	0	251,328	,972205	,908550	-1,36
12	80,00	14026,	57	0,	0	251,328	,963043	,896854	-1,34
13	71,67	13868,	59	0,	0	251,328	,953776	,885268	-1,27
14	63,33	13751,	61	0,	0	251,328	,944643	,873955	-1,16
15	55,00	13621,	63	0,	0	251,328	,935214	,863020	-1,04
16	46,67	13531,	66	0,	0	251,328	,925256	,852424	-,91
17	38,33	13507,	68	0,	0	251,328	,915343	,841985	-,81
18	30,00	15388,	70	0,	0	221,286	,907369	,831382	-,76
19	21,67	15451,	72	0,	0	221,286	,900491	,818818	-,73
20	13,33	15547,	75	0,	0	221,286	,893474	,805486	-,68
21	5,00	15665,	77	0,	0	221,286	,885869	,791470	-,61
22	-3,33	15761,	79	0,	0	221,286	,877277	,777051	-,53
23	-11,67	15771,	81	0,	0	221,286	,867398	,762430	-,47
24	-20,00	15673,	83	0,	0	221,286	,856065	,747503	-,49
25	-28,33	15515,	85	0,	0	221,286	,843257	,731870	-,60
26	-36,67	15355,	88	0,	0	221,286	,828726	,715232	-,76
27	-45,00	15160,	90	0,	0	221,286	,812431	,697612	-,88
28	-53,33	14995,	92	0,	0	221,286	,794538	,679439	-,92
29	-61,67	14875,	95	0,	0	221,286	,775263	,661004	-,96
30	-70,00	17108,	97	0,	0	190,852	,754842	,642159	-,98
31	-78,33	16918,	99	0,	0	190,852	,730733	,619938	-,92
32	-86,67	16690,	101	0,	0	190,852	,706614	,597824	-,83
33	-95,00	16427,	104	0,	0	190,852	,683878	,575996	-,82
34	-103,33	16133,	106	0,	0	190,852	,665053	,554187	-,87
35	-111,67	15779,	108	0,	0	190,852	,648124	,532452	-,87
36	-120,00	15410,	110	0,	0	190,852	,631124	,511264	-,86
37	-128,89	14882,	112	0,	0	190,852	,613177	,489434	-,87
38	-137,78	14026,	113	0,	0	190,852	,596123	,468260	-,88

40	-155,56	12135,	120	0,	0	190,852	,556473	,428375	-,93
41	-1[illegible],44	11656,	122	0,	0	190,852	,533543	,409374	-,95
42	-173,33	10806,	125	0,	0	190,8[illegible]	,508322	,391054	-,99
43	-182,22	10952,	128	0,	0	190,8[illegible]	,482318	,373524	-1,05
44	-191,11	11053,	131	0,	0	190,852	,456241	,356941	-1,10

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420, MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.58	50.	91.22	15950.	5	14355.	32
2.26	100.	176.32	16307.	32	12888.	33
3.18	150.	255.82	16807.	30	11534.	33
4.35	200.	329.28	16875.	30	10218.	33
5.70	250.	397.44	16891.	30	9002.	34
7.17	300.	460.91	16904.	30	7872.	35
8.89	350.	519.86	16916.	30	6843.	35
10.64	400.	574.57	16926.	30	5905.	35
12.79	450.	625.47	16936.	30	5043.	35
15.43	500.	672.96	16945.	30	4232.	35
18.89	550.	717.40	16954.	30	3452.	35
20.80	600.	758.80	16963.	30	2698.	35
22.94	650.	797.42	16972.	30	2001.	35
25.36	700.	833.23	16983.	30	1353.	36
28.12	750.	866.14	16993.	30	743.	36
31.29	800.	896.34	17003.	30	169.	36
34.97	850.	923.70	17014.	30	1.	6
39.29	900.	948.67	17024.	30	0.	6
44.44	950.	974.75	17034.	30	0.	6
50.67	1000.	1004.36	17044.	30	0.	44
58.32	1050.	1029.85	17053.	30	0.	44
68.00	1100.	1047.69	17062.	30	0.	44
80.47	1150.	1059.78	17071.	30	0.	44
97.24	1200.	1071.68	17078.	30	0.	44
120.80	1250.	1078.10	17086.	30	0.	44
156.22	1300.	1075.17	17093.	30	0.	44
215.36	1350.	1065.27	17101.	30	0.	44
331.12	1400.	1054.72	17108.	30	0.	44

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.420,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
156.22	1300.
215.36	1350.
241.59	1365.
290.45	1387.

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	- 1.50 in.
	- 2.00 in. (Uniform)
Penetration	- 250 ft.
Hammer	- Vulcan 560
Quake Factor, Tip	- .025 in.
	- .10 in.
	- .30 in.

6

6 0 0 0 R E M O T E B A T C H

UNITED COMPUTING 67, APEX/8L B.5.0

15.45.14.   06/25/76.

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JJJJJJJJJJJJ  YY        YY   GGGGGGGGGG    3333333333   BBBBBBBBBBB   JJJJJJJJJJJJ  BBBBBBBBBBB
JJJJJJJJJJJJ  YY        YY  GGGGGGGGGGGG  333333333333  BBBBBBBBBBBB  JJJJJJJJJJJJ  BBBBBBBBBBBB
     JJ       YY        YY  GG        G   3         33  BB        BB       JJ       BB        BB
     JJ       YY        YY  GG                      33  BB        BB       JJ       BB        BB
     JJ       YY        YY  GG                     33   BB        BB       JJ       BB        BB
     JJ       YY        YY  GG                    33    BB        BB       JJ       BB        BB
     JJ       YYY      YYY  GG                   33     BB        BB       JJ       BB        BB
     JJ        YYY    YYY   GG                  33      BBBBBBBBBBBB       JJ       BBBBBBBBBBBB
     JJ         YYY  YYY    GG       GGGG       333     BBBBBBBBBBB        JJ       BBBBBBBBBBB
     JJ           YYYY      GG       GGGG         33    BB        BB       JJ       BB        BB
     JJ            YY       GG         GG          33   BB        BB       JJ       BB        BB
     JJ            YY       GG         GG           33  BB        BB       JJ       BB        BB
     JJ            YY       GG         GG           33  BB        BB       JJ       BB        BB
JJ   JJ            YY       GG         GG   3       33  BB        BB  JJ   JJ       BB        BB
JJJJJJJ            YY       GGGGGGGGGGGG  333333333333  BBBBBBBBBBBB  JJJJJJJ       BBBBBBBBBBBB
 JJJJJ             YY        GGGGGGGGGG    3333333333   BBBBBBBBBBB    JJJJJ        BBBBBBBBBBB
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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 JUNE 1976

 PROB
   1       42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
           250FT PENETRATION -- VULCAN 560 HAMMER
           QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN.    RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                               1
     NEW HAMMER DATA OPTION                  1
     NEW MATERIAL DATA OPTION                1
     NEW PILE SECTION DATA OPTION            1
     NEW SOIL DATA OPTION                    1
     SPECIFIED BLOW COUNT OPTION             1
     OUTPUT OPTION FOR STRESS                1
     BPF FOR STRESS OUTPUT OPTION                         275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                 50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)            300.
     SPECIFIED SEGMENT LENGTH (FT)                        -0.00


TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION            VULCAN 560 HAMMER
     HAMMER EFFICIENCY                   .75
     HAMMER ENERGY (FT-LBS)        300000.00
     HAMMER EXPLOSIVE FORCE (LBS)      -0.00
     NUMBER OF HAMMER SEGMENTS             2

     SEGMENT     SLACK       WEIGHT      AREA     COEF OF     SPRING CONSTANT
      NUMBER     (IN)         (LB)     (SQ IN) RESTITUTION     (LB / IN)

         1        1000.00  60000.00      1.00       .60        6200000.00
         2        1000.00  42000.00      1.00       .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

            1         42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	2.000	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	50.	280	330
8	1	1.500	80.	330	410

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .05

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,025,MINIMUM WALL THICKNESS=1,50 IN, RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN,	WEIGHT LBS	AREA SQ,IN,	COEF RSTITU	SPR STIFF LBS/IN,
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	53477559,
3	160,00	0,00	7529,89	221,29	1,00	53477559,
4	150,00	0,00	7529,89	221,29	1,00	53477559,
5	140,00	0,00	7529,89	221,29	1,00	53477559,
6	130,00	0,00	7126,78	251,33	1,00	72885120,
7	121,67	0,00	7126,78	251,33	1,00	72885120,
8	113,33	0,00	7126,78	251,33	1,00	72885120,
9	105,00	0,00	7126,78	251,33	1,00	72885120,
10	96,67	0,00	7126,78	251,33	1,00	72885120,
11	88,33	0,00	7126,78	251,33	1,00	72885120,
12	80,00	0,00	7126,78	251,33	1,00	72885120,
13	71,67	0,00	7126,78	251,33	1,00	72885120,
14	63,33	0,00	7126,78	251,33	1,00	72885120,
15	55,00	0,00	7126,78	251,33	1,00	72885120,
16	46,67	0,00	7126,78	251,33	1,00	72885120,
17	38,33	0,00	7126,78	251,33	1,00	72885120,
18	30,00	0,00	7126,78	251,33	1,00	72885120,
19	21,67	0,00	7126,78	251,33	1,00	72885120,
20	13,33	0,00	7126,78	251,33	1,00	72885120,
21	5,00	0,00	7126,78	251,33	1,00	72885120,
22	-3,33	0,00	7126,78	251,33	1,00	72885120,
23	-11,67	0,00	7126,78	251,33	1,00	72885120,
24	-20,00	0,00	6274,91	221,29	1,00	64173070,
25	-28,33	0,00	6274,91	221,29	1,00	64173070,
26	-36,67	0,00	6274,91	221,29	1,00	64173070,
27	-45,00	0,00	6274,91	221,29	1,00	64173070,
28	-53,33	0,00	6274,91	221,29	1,00	64173070,
29	-61,67	0,00	6274,91	221,29	1,00	64173070,
30	-70,00	0,00	5411,90	190,85	1,00	55347138,
31	-78,33	0,00	5411,90	190,85	1,00	55347138,
32	-86,67	0,00	5411,90	190,85	1,00	55347138,
33	-95,00	0,00	5411,90	190,85	1,00	55347138,
34	-103,33	0,00	5411,90	190,85	1,00	55347138,
35	-111,67	0,00	5411,90	190,85	1,00	55347138,
36	-120,00	0,00	5411,90	190,85	1,00	55347138,
37	-128,33	0,00	5411,90	190,85	1,00	55347138,
38	-136,67	0,00	5411,90	190,85	1,00	55347138,
39	-145,00	0,00	5411,90	190,85	1,00	55347138,
40	-153,33	0,00	5411,90	190,85	1,00	55347138,
41	-161,67	0,00	5411,90	190,85	1,00	55347138,
42	-170,00	0,00	5772,69	190,85	1,00	51887942,
43	-178,89	0,00	5772,69	190,85	1,00	51887942,
44	-187,78	0,00	5772,69	190,85	1,00	51887942,
45	-196,67	0,00	5772,69	190,85	1,00	51887942,

47	-214,44	0,00	5772,69	190,85	1,00	51887942,
48	-223,33	0,00	5772,69	190,85	1,00	51887942,
49	-232,22	0,00	5772,69	190,85	1,00	51887942,
50	-241,11	1000,00	5772,69	190,85	1,00	51887942,

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,025,MINIMUM WALL THICKNESS=1,50 IN, RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14,00

PERMANENT SET OF PILE = ,0386 INCHES
NUMBER OF BLOWS PER FOOT = 310,98
TOTAL INTERVALS = 201

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4125848,	25	0,	132	1,000	1,403189	1,271577	-3,13
2	0,00	3392672,	35	0,	0	1,000	,972641	,719587	-2,35
3	160,00	15590,	37	0,	0	221,286	,955155	,691201	-2,22
4	150,00	15798,	40	0,	0	221,286	,950171	,675973	-2,07
5	140,00	15955,	42	0,	0	221,286	,945065	,661125	-1,92
6	130,00	14071,	44	0,	0	251,328	,939663	,646742	-1,77
7	121,67	14093,	46	0,	0	251,328	,935294	,636511	-1,65
8	113,33	14123,	49	0,	0	251,328	,930223	,626606	-1,53
9	105,00	14154,	51	0,	0	251,328	,924240	,617022	-1,43
10	96,67	14182,	53	0,	0	251,328	,917246	,607712	-1,32
11	88,33	14209,	55	0,	0	251,328	,909214	,598579	-1,23
12	80,00	14234,	57	0,	0	251,328	,900109	,589544	-1,15
13	71,67	14257,	59	0,	0	251,328	,890126	,580567	-1,07
14	63,33	14284,	62	0,	0	251,328	,879659	,571658	-,99
15	55,00	14313,	64	0,	0	251,328	,869953	,562883	-,90
16	46,67	14331,	66	0,	0	251,328	,862765	,554378	-,77
17	38,33	14310,	68	0,	0	251,328	,856788	,546394	-,64
18	30,00	14235,	70	0,	0	251,328	,850636	,539079	-,53
19	21,67	14158,	72	0,	0	251,328	,843575	,532399	-,42
20	13,33	14121,	74	0,	0	251,328	,835244	,526275	-,33
21	5,00	14136,	77	0,	0	251,328	,825374	,520568	-,27
22	-3,33	14177,	79	0,	0	251,328	,813936	,515095	-,24
23	-11,67	14172,	81	0,	0	251,328	,800762	,509552	-,23
24	-20,00	16018,	83	0,	0	221,286	,785661	,503547	-,24
25	-28,33	15896,	86	0,	0	221,286	,766600	,495955	-,23
26	-36,67	15744,	88	0,	0	221,286	,745577	,487535	-,22
27	-45,00	15505,	90	0,	0	221,286	,722568	,478090	-,22
28	-53,33	15302,	93	0,	0	221,286	,697679	,467572	-,19
29	-61,67	15112,	95	0,	0	221,286	,671122	,456132	-,15
30	-70,00	17257,	98	0,	0	190,852	,643122	,443775	-,08
31	-78,33	16947,	100	0,	0	190,852	,609873	,428365	-,01
32	-86,67	16575,	102	0,	0	190,852	,576160	,411769	-,02
33	-95,00	16149,	104	0,	0	190,852	,542012	,393711	-,05
34	-103,33	15692,	107	0,	0	190,852	,507872	,374401	-,10
35	-111,67	15181,	109	0,	0	190,852	,473619	,353852	-,13
36	-120,00	14615,	111	0,	0	190,852	,439626	,332490	-,14
37	-128,33	13994,	113	0,	0	190,852	,406015	,310627	-,17

39	-[illegible].00	12676.	117	0.	0	[illegible]0.852	.340924	.265696	-.36
40	-[illegible] 33	11953.	119	0.	0	[illegible]0.852	.309760	.242361	-.47
41	-161.67	11236.	122	0.	0	190.852	.279704	.218785	-.51
42	-170.00	10474.	125	0.	0	190.852	.250396	.195405	-.50
43	-178.89	9692.	128	0.	0	190.852	.219554	.171063	-.49
44	-187.78	9107.	131	0.	0	190.852	.188176	.147601	-.45
45	-196.67	8641.	133	0.	0	190.852	.157735	.125448	-.39
46	-205.56	7862.	134	0.	0	190.852	.129781	.105320	-.33
47	-214.44	6732.	135	0.	0	190.852	.106906	.087674	-.28
48	-223.33	5604.	135	0.	0	190.852	.089645	.073003	-.21
49	-232.22	4599.	134	0.	0	190.852	.075600	.061394	-.15
50	-241.11	3759.	139	0.	172	190.852	.063587	.052589	-.10

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.99	50.	25.73	15949.	5	14393.	32
2.75	100.	49.92	16075.	30	13360.	32
3.63	150.	72.68	16548.	30	12426.	31
4.55	200.	94.00	16828.	30	11353.	30
5.27	250.	113.84	16865.	30	10479.	41
6.08	300.	132.38	16882.	30	9665.	42
6.97	350.	149.70	16897.	30	8910.	42
7.92	400.	165.88	16911.	30	8184.	42
8.99	450.	180.97	16923.	30	7486.	42
10.22	500.	195.03	16936.	30	6831.	43
12.63	550.	208.12	16947.	30	6231.	43
13.43	600.	220.29	16958.	30	5655.	43
14.29	650.	231.59	16969.	30	5099.	43
15.21	700.	242.06	16984.	30	4561.	43
16.20	750.	251.76	16997.	30	4044.	43
17.26	800.	260.73	17010.	30	3540.	43
18.41	850.	268.98	17022.	30	3075.	44
19.66	900.	276.58	17034.	30	2653.	44
21.02	950.	283.53	17046.	30	2239.	44
22.50	1000.	289.89	17058.	30	1838.	44
24.12	1050.	295.67	17070.	30	1445.	44
25.91	1100.	300.89	17081.	30	1052.	44
27.87	1150.	305.64	17092.	30	667.	45
30.04	1200.	309.95	17102.	30	346.	45
32.46	1250.	313.78	17112.	30	24.	45
35.15	1300.	317.13	17121.	30	0.	50
38.17	1350.	320.04	17130.	30	0.	50
41.56	1400.	322.58	17139.	30	0.	50
45.41	1450.	324.78	17148.	30	0.	50
49.78	1500.	326.94	17157.	30	0.	50
54.81	1550.	328.79	17165.	30	0.	50
60.61	1600.	330.25	17173.	30	0.	50
67.34	1650.	331.25	17181.	30	0.	50
75.24	1700.	331.87	17189.	30	0.	50
84.56	1750.	331.88	17196.	30	0.	50
95.61	1800.	332.38	17203.	30	0.	50
108.88	1850.	335.04	17210.	30	0.	50
124.59	1900.	338.18	17216.	30	0.	50
143.48	1950.	341.50	17222.	30	0.	50
165.56	2000.	344.87	17227.	30	0.	50
191.28	2050.	348.29	17234.	30	0.	50
222.62	2100.	351.84	17241.	30	0.	50
261.15	2150.	355.39	17249.	30	0.	50

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 1A

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
143.48	1950.
191.28	2050.
261.15	2150.
310.98	2200.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 JUNE 1976

PROB
2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.10 ,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1	
NEW HAMMER DATA OPTION	1	
NEW MATERIAL DATA OPTION	1	
NEW PILE SECTION DATA OPTION	1	
NEW SOIL DATA OPTION	1	
SPECIFIED BLOW COUNT OPTION	1	
OUTPUT OPTION FOR STRESS	1	
BPF FOR STRESS OUTPUT OPTION		275.
ULTIMATE RESISTANCE INCREMENT (TONS)		50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)		300.
SPECIFIED SEGMENT LENGTH (FT)		-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF SECTIONS CHANGED 0
UMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	2.000	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	50.	280	330
8	1	1.500	80.	330	410

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

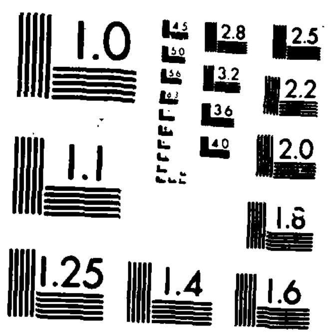
QTIP=,10 ,MINIMUM WALL THICKNESS=1,50 IN, RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	53477559,
3	160,00	0,00	7529,89	221,29	1,00	53477559,
4	150,00	0,00	7529,89	221,29	1,00	53477559,
5	140,00	0,00	7529,89	221,29	1,00	53477559,
6	130,00	0,00	7126,78	251,33	1,00	72885120,
7	121,67	0,00	7126,78	251,33	1,00	72885120,
8	113,33	0,00	7126,78	251,33	1,00	72885120,
9	105,00	0,00	7126,78	251,33	1,00	72885120,
10	96,67	0,00	7126,78	251,33	1,00	72885120,
11	88,33	0,00	7126,78	251,33	1,00	72885120,
12	80,00	0,00	7126,78	251,33	1,00	72885120,
13	71,67	0,00	7126,78	251,33	1,00	72885120,
14	63,33	0,00	7126,78	251,33	1,00	72885120,
15	55,00	0,00	7126,78	251,33	1,00	72885120,
16	46,67	0,00	7126,78	251,33	1,00	72885120,
17	38,33	0,00	7126,78	251,33	1,00	72885120,
18	30,00	0,00	7126,78	251,33	1,00	72885120,
19	21,67	0,00	7126,78	251,33	1,00	72885120,
20	13,33	0,00	7126,78	251,33	1,00	72885120,
21	5,00	0,00	7126,78	251,33	1,00	72885120,
22	-3,33	0,00	7126,78	251,33	1,00	72885120,
23	-11,67	0,00	7126,78	251,33	1,00	72885120,
24	-20,00	0,00	6274,91	221,29	1,00	64173070,
25	-28,33	0,00	6274,91	221,29	1,00	64173070,
26	-36,67	0,00	6274,91	221,29	1,00	64173070,
27	-45,00	0,00	6274,91	221,29	1,00	64173070,
28	-53,33	0,00	6274,91	221,29	1,00	64173070,
29	-61,67	0,00	6274,91	221,29	1,00	64173070,
30	-70,00	0,00	5411,90	190,85	1,00	55347138,
31	-78,33	0,00	5411,90	190,85	1,00	55347138,
32	-86,67	0,00	5411,90	190,85	1,00	55347138,
33	-95,00	0,00	5411,90	190,85	1,00	55347138,
34	-103,33	0,00	5411,90	190,85	1,00	55347138,
35	-111,67	0,00	5411,90	190,85	1,00	55347138,
36	-120,00	0,00	5411,90	190,85	1,00	55347138,
37	-128,33	0,00	5411,90	190,85	1,00	55347138,
38	-136,67	0,00	5411,90	190,85	1,00	55347138,
39	-145,00	0,00	5411,90	190,85	1,00	55347138,
40	-153,33	0,00	5411,90	190,85	1,00	55347138,
41	-161,67	0,00	5411,90	190,85	1,00	55347138,
42	-170,00	0,00	5772,69	190,85	1,00	51887942,
43	-178,89	0,00	5772,69	190,85	1,00	51887942,
44	-187,78	0,00	5772,69	190,85	1,00	51887942,
45	-196,67	0,00	5772,69	190,85	1,00	51887942,

AD-A163 522 FOUNDATION ANALYSIS EAST COAST AIR COMBAT MANEUVERING RANGE OFFSHORE KITT..(U) CREST ENGINEERING INC TULSA OK SEP 76 27-771-97 CHES/NAVFAC-FPO-7612 N62477-76-C-0179 3/6

UNCLASSIFIED F/G 13/13 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

47	-214,44	0,00	5772,69	190,85	1,00	51887942,
48	-223,33	0,00	5772,69	190,85	1,00	51887942,
49	-232,22	0,00	5772,69	190,85	1,00	51887942,
50	-241,11	1000,00	5772,69	190,85	1,00	51887942,

PROB 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,10 ,MINIMUM WALL THICKNESS=1,50 IN, RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35,00

PERMANENT SET OF PILE = ,0338 INCHES
NUMBER OF BLOWS PER FOOT = 355,11
TOTAL INTERVALS = 211

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4125848,	25	0,	141	1,000	1,436998	1,308582	-2,85
2	0,00	3392672,	35	0,	0	1,000	1,008850	,788910	-1,97
3	160,00	15590,	37	0,	0	221,286	,990674	,762402	-1,83
4	150,00	15798,	40	0,	0	221,286	,984395	,748610	-1,69
5	140,00	15955,	42	0,	0	221,286	,978686	,734896	-1,56
6	130,00	14071,	44	0,	0	251,328	,973531	,721399	-1,47
7	121,67	14093,	46	0,	0	251,328	,969712	,711649	-1,43
8	113,33	14123,	49	0,	0	251,328	,965636	,701964	-1,41
9	105,00	14154,	51	0,	0	251,328	,961165	,692227	-1,41
10	96,67	14182,	53	0,	0	251,328	,956090	,682302	-1,42
11	88,33	14209,	55	0,	0	251,328	,950205	,672155	-1,40
12	80,00	14234,	57	0,	0	251,328	,943339	,661940	-1,36
13	71,67	14257,	59	0,	0	251,328	,935443	,651906	-1,27
14	63,33	14284,	62	0,	0	251,328	,926416	,642248	-1,16
15	55,00	14313,	64	0,	0	251,328	,916386	,633036	-1,03
16	46,67	14330,	66	0,	0	251,328	,905688	,624186	-,93
17	38,33	14305,	68	0,	0	251,328	,895371	,615524	-,84
18	30,00	14221,	70	0,	0	251,328	,887050	,607043	-,74
19	21,67	14123,	72	0,	0	251,328	,880674	,598886	-,60
20	13,33	14055,	74	0,	0	251,328	,874458	,591205	-,45
21	5,00	14016,	77	0,	0	251,328	,867537	,584145	-,31
22	-3,33	14014,	79	0,	0	251,328	,859450	,577615	-,24
23	-11,67	13978,	81	0,	0	251,328	,849895	,571215	-,23
24	-20,00	15783,	83	0,	0	221,286	,838743	,564664	-,20
25	-28,33	15627,	85	0,	0	221,286	,824474	,557127	-,12
26	-36,67	15477,	88	0,	0	221,286	,808354	,549725	-,01
27	-45,00	15275,	90	0,	0	221,286	,790332	,542355	,07
28	-53,33	15098,	92	0,	0	221,286	,770519	,534567	,14
29	-61,67	14963,	95	0,	0	221,286	,749110	,526184	,22
30	-70,00	17186,	97	0,	0	190,852	,726358	,517084	,25
31	-78,33	16980,	99	0,	0	190,852	,699163	,505379	,27
32	-86,67	16742,	102	0,	0	190,852	,671419	,492336	,26
33	-95,00	16477,	104	0,	0	190,852	,643107	,477995	,21
34	-103,33	16172,	106	0,	0	190,852	,614549	,462387	,16
35	-111,67	15836,	108	0,	0	190,852	,585548	,445486	,09
36	-120,00	15458,	111	0,	0	190,852	,556968	,427404	,03
37	-128,33	15048,	113	0,	0	190,852	,527548	,408273	-,05

39	-[illegible].00	14141.	117	0.	0	[illegible]90.852	.470123	.367217	-.19
40	-[illegible]33	13604.	119	0.	0	[illegible]0.852	.442189	.345483	-.24
41	-16[illegible].67	13068.	121	0.	0	[illegible]90.852	.414821	.323043	-.27
42	-170.00	12533.	123	0.	0	190.852	.387713	.300098	-.31
43	-178.89	11938.	126	0.	0	190.852	.357258	.275175	-.34
44	-187.78	11327.	129	0.	0	190.852	.324707	.250075	-.37
45	-196.67	11171.	132	0.	0	190.852	.291080	.224873	-.36
46	-205.56	11159.	134	0.	0	190.852	.257783	.199963	-.35
47	-214.44	10737.	136	0.	0	190.852	.224854	.175477	-.32
48	-223.33	10220.	140	0.	0	190.852	.191303	.151802	-.26
49	-232.22	9810.	141	0.	0	190.852	.161230	.129214	-.19
50	-241.11	8654.	143	0.	0	190.852	.133792	.108165	-.13

PROH 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,10 ,MINIMUM WALL THICKNESS=1,50 IN, RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35,00

BLOWS/FT,	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ,IN,	SEG NO,	MAX T STRESS LBS/SQ,IN,	SEG NO,
1,76	50,	64,13	15950,	5	14133,	32
2,63	100,	124,19	16109,	35	13062,	32
3,58	150,	180,49	16621,	30	12089,	31
4,66	200,	232,93	16870,	30	10909,	30
5,46	250,	281,51	16887,	30	9647,	30
6,36	300,	326,80	16900,	30	8667,	41
7,41	350,	369,03	16912,	30	7761,	42
8,55	400,	408,37	16923,	30	6925,	42
9,85	450,	445,02	16933,	30	6129,	42
11,31	500,	479,12	16943,	30	5380,	42
13,69	550,	510,85	16952,	30	4669,	42
14,66	600,	540,36	16961,	30	3995,	43
15,71	650,	567,76	16969,	30	3376,	43
16,85	700,	593,22	16978,	30	2796,	43
18,08	750,	616,80	16987,	30	2238,	43
19,43	800,	638,66	16995,	30	1700,	43
20,89	850,	658,89	17005,	30	1182,	43
22,50	900,	677,57	17015,	30	684,	43
24,27	950,	694,80	17023,	30	198,	43
26,23	1000,	710,68	17033,	30	53,	3
28,40	1050,	725,30	17043,	30	45,	3
30,83	1100,	738,69	17053,	30	37,	3
33,55	1150,	750,99	17062,	30	27,	3
36,62	1200,	762,19	17072,	30	13,	3
40,11	1250,	772,39	17081,	30	0,	50
44,09	1300,	781,55	17090,	30	0,	50
48,68	1350,	789,70	17098,	30	0,	50
54,00	1400,	797,02	17106,	30	0,	50
60,23	1450,	803,54	17114,	30	0,	50
67,58	1500,	809,04	17121,	30	0,	50
76,41	1550,	813,53	17129,	30	0,	50
87,10	1600,	817,13	17137,	30	0,	50
100,31	1650,	820,08	17144,	30	0,	50
116,90	1700,	822,71	17152,	30	0,	50
138,45	1750,	825,06	17159,	30	0,	50
167,05	1800,	827,02	17166,	30	0,	50
207,02	1850,	828,25	17173,	30	0,	50
264,48	1900,	827,96	17180,	30	0,	50
355,11	1950,	825,79	17186,	30	0,	50

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
138.45	1750.
207.02	1850.
264.48	1900.
295.03	1920.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 JUNE 1976

 PROB
   3      42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
          250FT PENETRATION -- VULCAN 560 HAMMER
          QTIP=.30 ,MINIMUM WALL THICKNESS=1.50 IN.    RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                             1
     NEW HAMMER DATA OPTION                1
     NEW MATERIAL DATA OPTION              1
     NEW PILE SECTION DATA OPTION          1
     NEW SOIL DATA OPTION                  1
     SPECIFIED BLOW COUNT OPTION           1
     OUTPUT OPTION FOR STRESS              1
     BPF FOR STRESS OUTPUT OPTION                     275.
     ULTIMATE RESISTANCE INCREMENT (TONS)             50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)        300.
     SPECIFIED SEGMENT LENGTH (FT)                    -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION            VULCAN 560 HAMMER
     HAMMER EFFICIENCY                   .75
     HAMMER ENERGY (FT-LBS)        300000.00
     HAMMER EXPLOSIVE FORCE (LBS)      -0.00
     NUMBER OF HAMMER SEGMENTS             2

     SEGMENT     SLACK      WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER     (IN)        (LB)     (SQ IN) RESTITUTION     (LB / IN)

        1       1000.00  60000.00      1.00       .60       6200000.00
        2       1000.00  42000.00      1.00       .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

             1        42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	2.000	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	50.	280	330
8	1	1.500	80.	330	410

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE - JSIDE .15
POINT DAMPENING RESISTANCE - JPONT .15
SOIL QUAKE FOR SIDE - QSIDE .10
SOIL QUAKE FOR POINT - QPOINT .30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	7126.78	251.33	1.00	72885120.
19	21.67	0.00	7126.78	251.33	1.00	72885120.
20	13.33	0.00	7126.78	251.33	1.00	72885120.
21	5.00	0.00	7126.78	251.33	1.00	72885120.
22	-3.33	0.00	7126.78	251.33	1.00	72885120.
23	-11.67	0.00	7126.78	251.33	1.00	72885120.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5411.90	190.85	1.00	55347138.
31	-78.33	0.00	5411.90	190.85	1.00	55347138.
32	-86.67	0.00	5411.90	190.85	1.00	55347138.
33	-95.00	0.00	5411.90	190.85	1.00	55347138.
34	-103.33	0.00	5411.90	190.85	1.00	55347138.
35	-111.67	0.00	5411.90	190.85	1.00	55347138.
36	-120.00	0.00	5411.90	190.85	1.00	55347138.
37	-128.33	0.00	5411.90	190.85	1.00	55347138.
38	-136.67	0.00	5411.90	190.85	1.00	55347138.
39	-145.00	0.00	5411.90	190.85	1.00	55347138.
40	-153.33	0.00	5411.90	190.85	1.00	55347138.
41	-161.67	0.00	5411.90	190.85	1.00	55347138.
42	-170.00	0.00	5772.69	190.85	1.00	51887942.
43	-178.89	0.00	5772.69	190.85	1.00	51887942.
44	-187.78	0.00	5772.69	190.85	1.00	51887942.
45	-196.67	0.00	5772.69	190.85	1.00	51887942.

47	-214,44	0,00	5772,69	190,85	1,00	51887942,
48	-223,33	0,00	5772,69	190,85	1,00	51887942,
49	-232,22	0,00	5772,69	190,85	1,00	51887942,
50	-241,11	1000,00	5772,69	190,85	1,00	51887942,

PROB 3 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,30 ,MINIMUM WALL THICKNESS=1,50 IN, RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50,00

PERMANENT SET OF PILE = ,0397 INCHES
NUMBER OF BLOWS PER FOOT = 302,41
TOTAL INTERVALS = 283

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4125848,	25	0,	283	1,000	1,484925	-,961304	-15,54
2	0,00	3392672,	35	0,	283	1,000	1,065155	,490590	-2,43
3	160,00	15590,	37	485,	269	221,286	1,046032	,579127	-,28
4	150,00	15798,	40	860,	271	221,286	1,039143	,579464	-,30
5	140,00	15955,	42	1245,	265	221,286	1,031969	,579750	-,39
6	130,00	14071,	44	1319,	267	251,328	1,024792	,580351	-,49
7	121,67	14093,	46	1453,	269	251,328	1,020171	,581054	-,60
8	113,33	14123,	49	1506,	271	251,328	1,015958	,582133	-,76
9	105,00	14154,	51	1469,	273	251,328	1,011806	,583727	-,92
10	96,67	14182,	53	1398,	274	251,328	1,007587	,585642	-1,02
11	88,33	14209,	55	1246,	276	251,328	1,003030	,587509	-1,10
12	80,00	14234,	57	1146,	269	251,328	,997965	,589546	-1,24
13	71,67	14257,	59	1007,	272	251,328	,992049	,592201	-1,41
14	63,33	14284,	62	876,	273	251,328	,985142	,595251	-1,53
15	55,00	14313,	64	738,	276	251,328	,977082	,598122	-1,54
16	46,67	14329,	66	604,	278	251,328	,967910	,600502	-1,51
17	38,33	14302,	68	509,	281	251,328	,957704	,602415	-1,50
18	30,00	14210,	70	434,	283	251,328	,946808	,604086	-1,51
19	21,67	14097,	72	325,	283	251,328	,936162	,605582	-1,50
20	13,33	14005,	74	148,	283	251,328	,927449	,606704	-1,45
21	5,00	13928,	76	0,	0	251,328	,920671	,607215	-1,36
22	-3,33	13889,	79	0,	0	251,328	,914303	,607095	-1,26
23	-11,67	13830,	81	0,	0	251,328	,907380	,606425	-1,18
24	-20,00	15600,	83	0,	0	221,286	,899285	,605314	-1,13
25	-28,33	15437,	85	0,	0	221,286	,888725	,603655	-1,08
26	-36,67	15270,	87	0,	0	221,286	,876783	,601496	-1,02
27	-45,00	15083,	90	0,	0	221,286	,863311	,598651	-,93
28	-53,33	14937,	92	0,	0	221,286	,848375	,594918	-,84
29	-61,67	14824,	95	0,	0	221,286	,832115	,590121	-,73
30	-70,00	17101,	97	0,	0	190,852	,814599	,584150	-,61
31	-78,33	16986,	99	0,	0	190,852	,793617	,575857	-,47
32	-86,67	16844,	101	0,	0	190,852	,771942	,566170	-,35
33	-95,00	16675,	103	0,	0	190,852	,749811	,555145	-,24
34	-103,33	16492,	106	0,	0	190,852	,727160	,542882	-,16
35	-111,67	16296,	108	0,	0	190,852	,704207	,529552	-,10
36	-120,00	16069,	110	0,	0	190,852	,681049	,515308	-,06
37	-128,33	15802,	112	0,	0	190,852	,657697	,500286	-,04

39	-1[illegible]0	15210,	117	0,	0	[illegible],852	,612235	,468471	-,04
40	-1[illegible]3	14874,	119	0,	0	[illegible],852	,592055	,451824	-,05
41	-161,67	14504,	121	0,	0	1[illegible]0,852	,573642	,434797	-,07
42	-170,00	14130,	123	0,	0	190,852	,554758	,417237	-,08
43	-178,89	13622,	125	0,	0	190,852	,532803	,398046	-,08
44	-187,78	12863,	127	0,	0	190,852	,509714	,378394	-,10
45	-196,67	12045,	130	0,	0	190,852	,486303	,358314	-,11
46	-205,56	11951,	134	0,	0	190,852	,460883	,337798	-,12
47	-214,44	11791,	135	0,	0	190,852	,432036	,316847	-,12
48	-223,33	11465,	139	0,	0	190,852	,400999	,295579	-,12
49	-232,22	11870,	142	0,	0	190,852	,369930	,274124	-,11
50	-241,11	12002,	144	0,	0	190,852	,339682	,252605	-,10

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
230FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.50	50.	91.44	15951.	5	13974.	33
2.25	100.	176.80	16155.	36	12831.	32
3.28	150.	256.59	16639.	30	11820.	31
4.59	200.	330.71	16890.	30	10587.	30
5.64	250.	399.25	16903.	30	9286.	30
6.80	300.	462.96	16913.	30	8019.	30
8.08	350.	522.29	16922.	30	7034.	41
9.55	400.	577.57	16931.	30	6098.	41
11.32	450.	629.00	16939.	30	5221.	42
13.40	500.	676.84	16947.	30	4409.	42
16.26	550.	721.23	16954.	30	3634.	42
17.69	600.	762.44	16961.	30	2906.	42
19.26	650.	800.67	16968.	30	2220.	42
20.98	700.	836.16	16975.	30	1590.	42
22.90	750.	869.14	16982.	30	1007.	42
25.04	800.	899.85	16989.	30	465.	42
27.44	850.	928.67	16995.	30	159.	4
30.16	900.	955.56	17002.	30	148.	4
33.24	950.	980.33	17008.	30	137.	4
36.79	1000.	1003.51	17014.	30	125.	4
40.88	1050.	1024.94	17020.	30	111.	4
45.69	1100.	1044.17	17027.	30	98.	4
51.35	1150.	1061.37	17035.	30	85.	4
58.16	1200.	1076.05	17043.	30	73.	4
66.45	1250.	1088.78	17051.	30	58.	4
76.73	1300.	1101.54	17059.	30	1390.	10
89.88	1350.	1120.66	17066.	30	1427.	10
106.98	1400.	1140.28	17074.	30	1441.	10
130.37	1450.	1150.52	17081.	30	1455.	9
163.44	1500.	1156.21	17088.	30	1476.	9
214.96	1550.	1156.18	17094.	30	1483.	9
302.41	1600.	1145.31	17101.	30	1506.	8

PROH 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 10 -- SPECIFIED B UW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
130.37	1450.
214.96	1550.
243.62	1570.
302.41	1600.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 JUNE 1976

 PROB
   4       42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
           250FT PENETRATION -- VULCAN 560 HAMMER
           QTIP=.025, UNIFORM WALL THICKNESS=2.0 IN.    RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                              1
     NEW HAMMER DATA OPTION                 1
     NEW MATERIAL DATA OPTION               1
     NEW PILE SECTION DATA OPTION           1
     NEW SOIL DATA OPTION                   1
     SPECIFIED BLOW COUNT OPTION            1
     OUTPUT OPTION FOR STRESS               1
     BPF FOR STRESS OUTPUT OPTION                        275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)           300.
     SPECIFIED SEGMENT LENGTH (FT)                       -0.00


TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION            VULCAN 560 HAMMER
     HAMMER EFFICIENCY                      .75
     HAMMER ENERGY (FT-LBS)          300000.00
     HAMMER EXPLOSIVE FORCE (LBS)        -0.00
     NUMBER OF HAMMER SEGMENTS              2

     SEGMENT      SLACK       WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER      (IN)         (LB)     (SQ IN) RESTITUTION     (LB / IN)

        1        1000.00  60000.00      1.00        .60        6200000.00
        2        1000.00  42000.00      1.00        .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

            1         42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS       8
```

```
NUMBER OF SECTIONS CHANGED          0
NUMBER OF SECTIONS ADDED            0
LENGTH OF FREE STANDING PILE(FT)    160.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2.000	30.	0	30
2	1	2.000	90.	30	80
3	1	2.000	50.	80	130
4	1	2.000	50.	130	180
5	1	2.000	50.	180	230
6	1	2.000	50.	230	280
7	1	2.000	50.	280	330
8	1	2.000	80.	330	410

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES      1
SIDE DAMPENING RESISTANCE  = JSIDE       .15
POINT DAMPENING RESISTANCE = JPONT       .15
SOIL QUAKE FOR SIDE        = QSIDE       .10
SOIL QUAKE FOR POINT       = QPOINT      .05
```

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025, UNIFORM WALL THICKNESS=2.0 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	60737600.
3	160.00	0.00	8552.13	251.33	1.00	60737600.
4	150.00	0.00	8552.13	251.33	1.00	60737600.
5	140.00	0.00	8552.13	251.33	1.00	60737600.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	7126.78	251.33	1.00	72885120.
19	21.67	0.00	7126.78	251.33	1.00	72885120.
20	13.33	0.00	7126.78	251.33	1.00	72885120.
21	5.00	0.00	7126.78	251.33	1.00	72885120.
22	-3.33	0.00	7126.78	251.33	1.00	72885120.
23	-11.67	0.00	7126.78	251.33	1.00	72885120.
24	-20.00	0.00	7126.78	251.33	1.00	72885120.
25	-28.33	0.00	7126.78	251.33	1.00	72885120.
26	-36.67	0.00	7126.78	251.33	1.00	72885120.
27	-45.00	0.00	7126.78	251.33	1.00	72885120.
28	-53.33	0.00	7126.78	251.33	1.00	72885120.
29	-61.67	0.00	7126.78	251.33	1.00	72885120.
30	-70.00	0.00	7126.78	251.33	1.00	72885120.
31	-78.33	0.00	7126.78	251.33	1.00	72885120.
32	-86.67	0.00	7126.78	251.33	1.00	72885120.
33	-95.00	0.00	7126.78	251.33	1.00	72885120.
34	-103.33	0.00	7126.78	251.33	1.00	72885120.
35	-111.67	0.00	7126.78	251.33	1.00	72885120.
36	-120.00	0.00	7126.78	251.33	1.00	72885120.
37	-128.33	0.00	7126.78	251.33	1.00	72885120.
38	-136.67	0.00	7126.78	251.33	1.00	72885120.
39	-145.00	0.00	7126.78	251.33	1.00	72885120.
40	-153.33	0.00	7126.78	251.33	1.00	72885120.
41	-161.67	0.00	7126.78	251.33	1.00	72885120.
42	-170.00	0.00	7601.90	251.33	1.00	68329800.
43	-178.89	0.00	7601.90	251.33	1.00	68329800.
44	-187.78	0.00	7601.90	251.33	1.00	68329800.

47	-214,44	0,00	7601,90	251,33	1,00	68329800,
48	-223,33	0,00	7601,90	251,33	1,00	68329800,
49	-232,22	0,00	7601,90	251,33	1,00	68329800,
50	-241,11	1000,00	7601,90	251,33	1,00	68329800,

PROB 4 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,025, UNIFORM WALL THICKNESS=2,0 IN, RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14,00

PERMANENT SET OF PILE = ,0403 INCHES
NUMBER OF BLOWS PER FOOT = 297,74
TOTAL INTERVALS = 138

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0,00	4179192,	24	0,	61	1,000	1,318565	1,314362	-,29
2	0,00	3461312,	32	0,	0	1,000	,925308	,895053	-1,10
3	160,00	13827,	34	0,	0	251,328	,908012	,874134	-1,17
4	150,00	13862,	36	0,	0	251,328	,900106	,862319	-1,24
5	140,00	13927,	39	0,	0	251,328	,891435	,849345	-1,31
6	130,00	13954,	41	0,	0	251,328	,882236	,835205	-1,37
7	121,67	13980,	43	0,	0	251,328	,874609	,822626	-1,42
8	113,33	14006,	45	0,	0	251,328	,867458	,809258	-1,47
9	105,00	14033,	47	0,	0	251,328	,861130	,795118	-1,52
10	96,67	14059,	49	0,	0	251,328	,855583	,780234	-1,56
11	88,33	14086,	51	0,	0	251,328	,850376	,764637	-1,60
12	80,00	14112,	53	0,	0	251,328	,844936	,748349	-1,63
13	71,67	14139,	55	0,	0	251,328	,839008	,731401	-1,66
14	63,33	14166,	57	0,	0	251,328	,832352	,713850	-1,68
15	55,00	14193,	59	0,	0	251,328	,824788	,695750	-1,70
16	46,67	14224,	61	0,	0	251,328	,816127	,677171	-1,71
17	38,33	14263,	63	0,	0	251,328	,806312	,658206	-1,73
18	30,00	14325,	65	0,	0	251,328	,795103	,638968	-1,74
19	21,67	14420,	67	0,	0	251,328	,782570	,619556	-1,74
20	13,33	14554,	69	0,	0	251,328	,768575	,600081	-1,75
21	5,00	14727,	71	0,	0	251,328	,753038	,580663	-1,74
22	-3,33	14897,	74	0,	0	251,328	,735904	,561390	-1,74
23	-11,67	15025,	76	0,	0	251,328	,717187	,542235	-1,72
24	-20,00	15103,	78	0,	0	251,328	,696977	,523141	-1,71
25	-28,33	15130,	80	0,	0	251,328	,675399	,504062	-1,69
26	-36,67	15107,	82	0,	0	251,328	,652600	,484920	-1,66
27	-45,00	15035,	84	0,	0	251,328	,628724	,465654	-1,63
28	-53,33	14916,	86	0,	0	251,328	,603907	,446268	-1,61
29	-61,67	14750,	88	0,	0	251,328	,578251	,426722	-1,59
30	-70,00	14539,	90	0,	0	251,328	,551814	,406978	-1,57
31	-78,33	14283,	92	0,	0	251,328	,524706	,387062	-1,55
32	-86,67	13989,	95	0,	0	251,328	,497171	,367043	-1,53
33	-95,00	13658,	97	0,	0	251,328	,469127	,346906	-1,53
34	-103,33	13288,	99	0,	0	251,328	,440954	,326660	-1,54
35	-111,67	12883,	101	0,	0	251,328	,412679	,306431	-1,58
36	-120,00	[illegible]	103	0,	0	251,328	,384403	,286171	-1,65

39	-[illegible].00	10883.	109	0.	0	[illegible]1.328	.301903	.224469	-1.83
40	-[illegible]3	10292.	111	0.	0	[illegible].328	.275667	.204597	-1.79
41	-161.67	9689.	113	0.	0	[illegible]1.328	.250317	.185352	-1.77
42	-170.00	9033.	116	0.	0	251.328	.225919	.166881	-1.71
43	-178.89	8532.	118	0.	0	251.328	.199943	.148588	-1.64
44	-187.78	7824.	122	0.	0	251.328	.173327	.132012	-1.50
45	-196.67	7479.	123	0.	0	251.328	.147371	.117893	-1.38
46	-205.56	6730.	124	0.	0	251.328	.123553	.105246	-1.23
47	-214.44	5905.	126	0.	0	251.328	.102962	.094012	-1.05
48	-223.33	5000.	125	0.	0	251.328	.087878	.083860	-.80
49	-232.22	4072.	124	0.	0	251.328	.075726	.074253	-.55
50	-241.11	3257.	129	0.	0	251.328	.065304	.064815	-.39

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025, UNIFORM WALL THICKNESS=2.0 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 10.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.03	50.	23.84	13958.	X	0.	10
2.79	100.	45.87	13997.	X	0.	9
3.58	150.	67.08	14160.	29	11234.	9
4.63	200.	87.23	14462.	27	10716.	9
5.41	250.	106.34	14516.	28	9976.	9
6.16	300.	124.49	14533.	27	9266.	8
6.92	350.	141.71	14547.	27	8590.	8
7.73	400.	158.04	14561.	27	8012.	41
8.63	450.	173.49	14573.	27	7477.	41
9.61	500.	188.12	14586.	26	6962.	41
10.70	550.	201.95	14600.	26	6461.	41
11.87	600.	215.04	14613.	26	5976.	41
14.27	650.	227.42	14626.	26	5509.	42
15.03	700.	239.10	14639.	26	5079.	42
15.83	750.	250.12	14652.	26	4675.	43
16.68	800.	260.51	14665.	26	4295.	43
17.58	850.	270.30	14678.	26	3927.	43
18.53	900.	279.51	14690.	26	3567.	43
19.55	950.	288.15	14703.	26	3216.	43
20.63	1000.	296.25	14715.	26	2871.	43
21.80	1050.	303.85	14727.	26	2564.	44
23.04	1100.	310.96	14740.	26	2271.	44
24.39	1150.	317.59	14752.	25	1980.	44
25.83	1200.	323.76	14765.	25	1693.	44
27.40	1250.	329.51	14778.	25	1410.	44
29.08	1300.	334.83	14791.	25	1125.	44
30.92	1350.	339.75	14804.	25	861.	45
32.92	1400.	344.30	14817.	25	625.	45
35.10	1450.	348.49	14830.	25	421.	46
37.50	1500.	352.38	14842.	25	235.	46
40.12	1550.	356.16	14856.	25	50.	46
43.04	1600.	359.74	14870.	25	0.	50
46.23	1650.	363.01	14885.	25	0.	50
49.80	1700.	365.91	14899.	25	0.	50
53.80	1750.	368.48	14913.	25	0.	50
58.25	1800.	370.86	14927.	25	0.	50
63.31	1850.	372.83	14940.	25	0.	50
69.01	1900.	374.24	14954.	25	0.	50
75.50	1950.	375.36	14968.	25	0.	50
82.96	2000.	376.18	14982.	25	0.	50
91.39	2050.	376.73	14995.	25	0.	50
101.28	2100.	378.94	15009.	25	0.	50
112.53	2150.	381.73	15023.	25	0.	50

123,77	2200,	384,82	15036,	25	0,	50
140,79	2250,	388,10	15050,	25	0,	50
158,25	2300,	391,51	15063,	25	0,	50
177,53	2350,	394,95	15077,	25	0,	50
200,12	2400,	398,48	15090,	25	0,	50
226,49	2450,	402,02	15103,	25	0,	50
258,12	2500,	405,69	15117,	25	0,	50
297,74	2550,	409,31	15130,	25	0,	50
348,14	2600,	413,00	15143,	25	0,	50

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025, UNIFORM WALL THICKNESS=2.0 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
125.77	2200.
177.53	2350.
226.49	2450.
297.74	2550.

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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 JUNE 1976

 PROB
   5      42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
          250FT PENETRATION -- VULCAN 560 HAMMER
          GTIP=0.10, UNIFORM WALL THICKNESS=2.0 IN.   RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                                1
     NEW HAMMER DATA OPTION                   1
     NEW MATERIAL DATA OPTION                 1
     NEW PILE SECTION DATA OPTION             1
     NEW SOIL DATA OPTION                     1
     SPECIFIED BLOW COUNT OPTION              1
     OUTPUT OPTION FOR STRESS                 1
     BPF FOR STRESS OUTPUT OPTION                         275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                 50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)            300.
     SPECIFIED SEGMENT LENGTH (FT)                        -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION              VULCAN 560 HAMMER
     HAMMER EFFICIENCY                       .75
     HAMMER ENERGY (FT-LBS)           300000.00
     HAMMER EXPLOSIVE FORCE (LBS)         -0.00
     NUMBER OF HAMMER SEGMENTS               2

     SEGMENT     SLACK       WEIGHT      AREA    COEF OF    SPRING CONSTANT
      NUMBER     (IN)         (LB)     (SQ IN) RESTITUTION    (LB / IN)

         1      1000.00   60000.00      1.00       .60       6200000.00
         2      1000.00   42000.00      1.00       .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =    1

         MATERIAL      (TCD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

             1        42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS       8
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160,00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2,000	30,	0	30
2	1	2,000	50,	30	80
3	1	2,000	50,	80	130
4	1	2,000	50,	130	180
5	1	2,000	50,	180	230
6	1	2,000	50,	230	280
7	1	2,000	50,	280	330
8	1	1,500	80,	330	410

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE ,15
POINT DAMPENING RESISTANCE = JPONT ,15
SOIL QUAKE FOR SIDE = QSIDE ,10
SOIL QUAKE FOR POINT = QPOINT ,10

TIP RESISTANCE PERCENTAGE
55,0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150,	25,
200,	25,
250,	25,
300,	25,

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=0.10, UNIFORM WALL THICKNESS=2.0 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	60737600.
3	160.00	0.00	8552.13	251.33	1.00	60737600.
4	150.00	0.00	8552.13	251.33	1.00	60737600.
5	140.00	0.00	8552.13	251.33	1.00	60737600.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	7126.78	251.33	1.00	72885120.
19	21.67	0.00	7126.78	251.33	1.00	72885120.
20	13.33	0.00	7126.78	251.33	1.00	72885120.
21	5.00	0.00	7126.78	251.33	1.00	72885120.
22	-3.33	0.00	7126.78	251.33	1.00	72885120.
23	-11.67	0.00	7126.78	251.33	1.00	72885120.
24	-20.00	0.00	7126.78	251.33	1.00	72885120.
25	-28.33	0.00	7126.78	251.33	1.00	72885120.
26	-36.67	0.00	7126.78	251.33	1.00	72885120.
27	-45.00	0.00	7126.78	251.33	1.00	72885120.
28	-53.33	0.00	7126.78	251.33	1.00	72885120.
29	-61.67	0.00	7126.78	251.33	1.00	72885120.
30	-70.00	0.00	7126.78	251.33	1.00	72885120.
31	-78.33	0.00	7126.78	251.33	1.00	72885120.
32	-86.67	0.00	7126.78	251.33	1.00	72885120.
33	-95.00	0.00	7126.78	251.33	1.00	72885120.
34	-103.33	0.00	7126.78	251.33	1.00	72885120.
35	-111.67	0.00	7126.78	251.33	1.00	72885120.
36	-120.00	0.00	7126.78	251.33	1.00	72885120.
37	-128.33	0.00	7126.78	251.33	1.00	72885120.
38	-136.67	0.00	7126.78	251.33	1.00	72885120.
39	-145.00	0.00	7126.78	251.33	1.00	72885120.
40	-153.33	0.00	7126.78	251.33	1.00	72885120.
41	-161.67	0.00	7126.78	251.33	1.00	72885120.
42	-170.00	0.00	5772.69	190.85	1.00	51887942.
43	-178.89	0.00	5772.69	190.85	1.00	51887942.
44	-187.78	0.00	5772.69	190.85	1.00	51887942.
45	-196.67	0.00	5772.69	190.85	1.00	51887942.

47	-214,44	0,00	5772,69	190,85	1,00	51887942,
48	-223,33	0,00	5772,69	190,85	1,00	51887942,
49	-232,22	0,00	5772,69	190,85	1,00	51887942,
50	-241,11	1000,00	5772,69	190,85	1,00	51887942,

PROB 5 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=0,10, UNIFORM WALL THICKNESS=2,0 IN, RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35,00

PERMANENT SET OF PILE = ,0396 INCHES
NUMBER OF BLOWS PER FOOT = 302,83
TOTAL INTERVALS = 156

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4177988,	27	0,	68	1,000	1,345293	1,343881	-,15
2	0,00	3464349,	35	0,	0	1,000	,953112	,933215	-,73
3	160,00	13825,	38	0,	0	251,328	,937137	,915171	-,78
4	150,00	13862,	40	0,	0	251,328	,930605	,906575	-,83
5	140,00	13927,	43	0,	0	251,328	,923238	,897153	-,88
6	130,00	13948,	45	0,	0	251,328	,915066	,886871	-,92
7	121,67	13977,	48	0,	0	251,328	,907764	,877698	-,96
8	113,33	14007,	50	0,	0	251,328	,900101	,867920	-,99
9	105,00	14033,	52	0,	0	251,328	,892378	,857527	-1,02
10	96,67	14056,	54	0,	0	251,328	,885130	,846516	-1,05
11	88,33	14080,	57	0,	0	251,328	,878911	,834901	-1,07
12	80,00	14112,	59	0,	0	251,328	,873458	,822696	-1,09
13	71,67	14140,	61	0,	0	251,328	,868030	,809918	-1,10
14	63,33	14165,	63	0,	0	251,328	,862256	,796611	-1,09
15	55,00	14187,	65	0,	0	251,328	,855937	,782864	-1,08
16	46,67	14220,	68	0,	0	251,328	,848904	,768760	-1,05
17	38,33	14258,	70	0,	0	251,328	,841094	,754393	-1,02
18	30,00	14305,	72	0,	0	251,328	,832343	,739856	-,99
19	21,67	14369,	75	0,	0	251,328	,822577	,725185	-,99
20	13,33	14469,	77	0,	0	251,328	,811749	,710361	-,99
21	5,00	14588,	79	0,	0	251,328	,799838	,695378	-1,01
22	-3,33	14699,	81	0,	0	251,328	,786823	,680301	-1,03
23	-11,67	14791,	84	0,	0	251,328	,772695	,665225	-1,03
24	-20,00	14850,	86	0,	0	251,328	,757523	,650268	-1,01
25	-28,33	14872,	88	0,	0	251,328	,741328	,635517	-1,02
26	-36,67	14873,	91	0,	0	251,328	,724108	,620905	-1,05
27	-45,00	14847,	93	0,	0	251,328	,705980	,606219	-1,10
28	-53,33	14784,	95	0,	0	251,328	,687073	,591378	-1,16
29	-61,67	14695,	98	0,	0	251,328	,667519	,576488	-1,21
30	-70,00	14586,	100	0,	0	251,328	,647724	,561530	-1,29
31	-78,33	14444,	102	0,	0	251,328	,628161	,546332	-1,38
32	-86,67	14269,	104	0,	0	251,328	,608927	,530910	-1,47
33	-95,00	14071,	107	0,	0	251,328	,589642	,515367	-1,56
34	-103,33	13817,	109	0,	0	251,328	,570410	,499552	-1,67
35	-111,67	13460,	111	0,	0	251,328	,551913	,483391	-1,79
36	-120,00	13000,	113	0,	0	251,328	,533840	,466834	-1,96
37	-128,33	12542,	116	0,	0	251,328	,515618	,449623	-2,12
38	-136,67	[illegible]	118	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

38	-156,67	12157,	118	0,	0	251,328	,497174	,431616	-2,24
39	-1[illegible],00	11608,	120	0,	0	[illegible]1,328	,478089	,412902	-2,30
40	-[illegible],33	11090,	123	0,	0	[illegible],328	,458155	,393907	-2,33
41	-1[illegible],67	10639,	125	0,	0	[illegible]51,328	,437150	,374811	-2,32
42	-170,00	13414,	128	0,	0	190,852	,414591	,355559	-2,26
43	-178,89	12751,	130	0,	0	190,852	,381164	,328159	-2,19
44	-187,78	12122,	133	0,	0	190,852	,345709	,300443	-2,16
45	-196,67	12004,	137	0,	0	190,852	,308961	,272498	-2,09
46	-205,56	11925,	139	0,	0	190,852	,272575	,245060	-1,81
47	-214,44	11519,	140	0,	0	190,852	,236427	,218706	-1,48
48	-223,33	11016,	144	0,	0	190,852	,200452	,192593	-1,13
49	-232,22	10447,	145	0,	0	190,852	,168636	,166372	-,77
50	-241,11	9205,	147	0,	0	190,852	,139627	,139416	-,32

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=0.10, UNIFORM WALL THICKNESS=2.0 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.78	50.	63.76	15485.	42	15464.	42
2.55	100.	123.58	15796.	42	14010.	42
3.40	150.	179.75	16086.	42	12839.	42
4.42	200.	232.43	16285.	42	11723.	42
5.40	250.	281.42	16222.	42	10639.	42
6.27	300.	327.25	16150.	42	9621.	42
7.23	350.	370.14	16076.	42	8653.	42
8.30	400.	410.25	16001.	42	7744.	42
9.50	450.	447.78	15925.	42	6880.	42
10.84	500.	482.86	15850.	42	6058.	42
12.31	550.	515.67	15773.	42	5279.	42
13.86	600.	546.31	15695.	42	4547.	42
15.16	650.	574.95	15618.	42	3858.	42
16.16	700.	601.68	15539.	42	3197.	42
17.24	750.	626.61	15460.	42	2571.	42
18.41	800.	649.88	15380.	42	1976.	42
19.68	850.	671.56	15300.	42	1412.	42
21.07	900.	691.72	15225.	42	870.	42
22.57	950.	710.47	15146.	42	341.	42
24.22	1000.	727.92	15070.	42	0.	50
26.03	1050.	744.09	14994.	42	0.	50
28.02	1100.	759.08	14918.	42	0.	50
30.23	1150.	772.99	14841.	42	0.	50
32.68	1200.	785.82	14762.	42	0.	50
35.42	1250.	797.69	14715.	26	0.	50
38.49	1300.	808.59	14724.	26	0.	50
41.96	1350.	818.57	14734.	26	0.	50
45.89	1400.	827.62	14744.	25	0.	50
50.41	1450.	835.76	14754.	25	0.	50
55.58	1500.	843.34	14764.	25	0.	50
61.61	1550.	850.00	14774.	25	0.	50
68.64	1600.	855.71	14784.	25	0.	50
77.03	1650.	860.50	14794.	25	0.	50
86.97	1700.	864.44	14804.	25	0.	50
99.14	1750.	867.85	14813.	25	0.	50
114.10	1800.	870.89	14823.	25	0.	50
133.18	1850.	873.63	14833.	26	0.	50
157.67	1900.	876.14	14843.	26	0.	50
190.56	1950.	878.00	14853.	26	0.	50
236.01	2000.	878.55	14863.	26	0.	50
302.83	2050.	878.40	14873.	26	0.	50

PRUN 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=0.10, UNIFORM WALL THICKNESS=2.0 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
133.18	1850.
190.56	1950.
236.01	2000.
302.83	2050.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 JUNE 1976

 PROB
   6       42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
           250FT PENETRATION -- VULCAN 560 HAMMER
           QTIP=.30, UNIFORM WALL THICKNESS=2.0 IN.     RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

      PILE TYPE                          1
      NEW HAMMER DATA OPTION             1
      NEW MATERIAL DATA OPTION           1
      NEW PILE SECTION DATA OPTION       1
      NEW SOIL DATA OPTION               1
      SPECIFIED BLOW COUNT OPTION        1
      OUTPUT OPTION FOR STRESS           1
      BPF FOR STRESS OUTPUT OPTION                     275.
      ULTIMATE RESISTANCE INCREMENT (TONS)             50.0
      MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)        300.
      SPECIFIED SEGMENT LENGTH (FT)                    -0.00

TABLE 2 -- HAMMER DATA

      HAMMER DESCRIPTION           VULCAN 560 HAMMER
      HAMMER EFFICIENCY                   .75
      HAMMER ENERGY (FT-LBS)        300000.00
      HAMMER EXPLOSIVE FORCE (LBS)      -0.00
      NUMBER OF HAMMER SEGMENTS             2

      SEGMENT     SLACK       WEIGHT      AREA     COEF OF    SPRING CONSTANT
       NUMBER     (IN)         (LB)     (SQ IN) RESTITUTION    (LB / IN)

         1       1000.00  60000.00      1.00        .60        6200000.00
         2       1000.00  42000.00      1.00        .90              0.00

TABLE 3 -- MATERIAL DATA

      NUMBER OF MATERIAL TYPES =     1

          MATERIAL       (TOD)   UNIT WT.   MODULUS
            TYPE                  (PCF)      (PSI)

             1          42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

```
TOTAL NUMBER OF PILE SECTIONS          8
NUMBER OF SECTIONS CHANGED             0
NUMBER OF SECTIONS ADDED               0
LENGTH OF FREE STANDING PILE(FT)       160,00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2,000	30,	0	30
2	1	2,000	50,	30	80
3	1	2,000	50,	80	130
4	1	2,000	50,	130	180
5	1	2,000	50,	180	230
6	1	2,000	50,	230	280
7	1	2,000	50,	280	330
8	1	2,000	80,	330	410

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES     1
SIDE DAMPENING RESISTANCE  = JSIDE       ,15
POINT DAMPENING RESISTANCE = JPONT       ,15
SOIL QUAKE FOR SIDE        = QSIDE       ,10
SOIL QUAKE FOR POINT       = QPOINT      ,30
```

TIP RESISTANCE PERCENTAGE
50,0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150,	25,
200,	25,
250,	25,
300,	25,

PROB 6 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,30, UNIFORM WALL THICKNESS=2,0 IN, RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV	SLACK	WEIGHT	AREA	COEF RSTITU	SPR STIFF
	FT	IN,	LBS	SQ,IN,		LBS/IN,
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	60737600,
3	160,00	0,00	8552,13	251,33	1,00	60737600,
4	150,00	0,00	8552,13	251,33	1,00	60737600,
5	140,00	0,00	8552,13	251,33	1,00	60737600,
6	130,00	0,00	7126,78	251,33	1,00	72885120,
7	121,67	0,00	7126,78	251,33	1,00	72885120,
8	113,33	0,00	7126,78	251,33	1,00	72885120,
9	105,00	0,00	7126,78	251,33	1,00	72885120,
10	96,67	0,00	7126,78	251,33	1,00	72885120,
11	88,33	0,00	7126,78	251,33	1,00	72885120,
12	80,00	0,00	7126,78	251,33	1,00	72885120,
13	71,67	0,00	7126,78	251,33	1,00	72885120,
14	63,33	0,00	7126,78	251,33	1,00	72885120,
15	55,00	0,00	7126,78	251,33	1,00	72885120,
16	46,67	0,00	7126,78	251,33	1,00	72885120,
17	38,33	0,00	7126,78	251,33	1,00	72885120,
18	30,00	0,00	7126,78	251,33	1,00	72885120,
19	21,67	0,00	7126,78	251,33	1,00	72885120,
20	13,33	0,00	7126,78	251,33	1,00	72885120,
21	5,00	0,00	7126,78	251,33	1,00	72885120,
22	-3,33	0,00	7126,78	251,33	1,00	72885120,
23	-11,67	0,00	7126,78	251,33	1,00	72885120,
24	-20,00	0,00	7126,78	251,33	1,00	72885120,
25	-28,33	0,00	7126,78	251,33	1,00	72885120,
26	-36,67	0,00	7126,78	251,33	1,00	72885120,
27	-45,00	0,00	7126,78	251,33	1,00	72885120,
28	-53,33	0,00	7126,78	251,33	1,00	72885120,
29	-61,67	0,00	7126,78	251,33	1,00	72885120,
30	-70,00	0,00	7126,78	251,33	1,00	72885120,
31	-78,33	0,00	7126,78	251,33	1,00	72885120,
32	-86,67	0,00	7126,78	251,33	1,00	72885120,
33	-95,00	0,00	7126,78	251,33	1,00	72885120,
34	-103,33	0,00	7126,78	251,33	1,00	72885120,
35	-111,67	0,00	7126,78	251,33	1,00	72885120,
36	-120,00	0,00	7126,78	251,33	1,00	72885120,
37	-128,33	0,00	7126,78	251,33	1,00	72885120,
38	-136,67	0,00	7126,78	251,33	1,00	72885120,
39	-145,00	0,00	7126,78	251,33	1,00	72885120,
40	-153,33	0,00	7126,78	251,33	1,00	72885120,
41	-161,67	0,00	7126,78	251,33	1,00	72885120,
42	-170,00	0,00	7601,90	251,33	1,00	68329800,
43	-178,89	0,00	7601,90	251,33	1,00	68329800,
44	-187,78	0,00	7601,90	251,33	1,00	68329800,
45	-196,67	0,00	7601,90	251,33	1,00	68329800,
[illegible]	-205,5[illegible]	0,00	7601,90	251,33	1,00	68329800,

46	-205.56	0.00	7601.90	251.33	1.00	68329800.
47	-214.44	0.00	7601.90	251.33	.00	68329800.
48	-223.33	0.00	7601.90	251.33	.00	68329800.
49	-232.22	0.00	7601.90	251.33	1.00	68329800.
50	-241.11	1000.00	7601.90	251.33	1.00	68329800.

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.30, UNIFORM WALL THICKNESS=2.0 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0405 INCHES
NUMBER OF BLOWS PER FOOT = 296.29
TOTAL INTERVALS = 144

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4179192.	24	0.	61	1.000	1.369096	1.368551	-.09
2	0.00	3461312.	32	0.	0	1.000	.976224	.959823	-.55
3	160.00	13827.	34	0.	0	251.328	.961145	.943222	-.60
4	150.00	13862.	36	0.	0	251.328	.955655	.936327	-.64
5	140.00	13927.	39	0.	0	251.328	.949427	.928806	-.67
6	130.00	13954.	41	0.	0	251.328	.942419	.920641	-.71
7	121.67	13980.	43	0.	0	251.328	.936036	.913374	-.74
8	113.33	14006.	45	0.	0	251.328	.929126	.905625	-.76
9	105.00	14033.	47	0.	0	251.328	.921756	.897386	-.79
10	96.67	14059.	49	0.	0	251.328	.913990	.888645	-.81
11	88.33	14086.	51	0.	0	251.328	.906086	.879386	-.83
12	80.00	14112.	53	0.	0	251.328	.898616	.869593	-.84
13	71.67	14139.	55	0.	0	251.328	.892488	.859260	-.86
14	63.33	14166.	57	0.	0	251.328	.886975	.848381	-.86
15	55.00	14193.	59	0.	0	251.328	.881267	.836943	-.87
16	46.67	14221.	61	0.	0	251.328	.875154	.824959	-.87
17	38.33	14254.	63	0.	0	251.328	.868483	.812457	-.87
18	30.00	14296.	65	0.	0	251.328	.861160	.799467	-.87
19	21.67	14351.	67	0.	0	251.328	.853158	.786024	-.87
20	13.33	14423.	69	0.	0	251.328	.844367	.772193	-.88
21	5.00	14512.	71	0.	0	251.328	.834732	.758026	-.90
22	-3.33	14599.	73	0.	0	251.328	.824220	.743578	-.91
23	-11.67	14666.	75	0.	0	251.328	.812841	.728938	-.93
24	-20.00	14712.	77	0.	0	251.328	.800644	.714200	-.96
25	-28.33	14738.	79	0.	0	251.328	.787673	.699398	-.99
26	-36.67	14744.	81	0.	0	251.328	.773953	.684542	-1.01
27	-45.00	14731.	83	0.	0	251.328	.759501	.669698	-1.04
28	-53.33	14698.	85	0.	0	251.328	.744392	.654969	-1.06
29	-61.67	14649.	88	0.	0	251.328	.728563	.640417	-1.06
30	-70.00	14582.	90	0.	0	251.328	.712027	.626134	-1.04
31	-78.33	14496.	92	0.	0	251.328	.694991	.612320	-1.00
32	-86.67	14392.	94	0.	0	251.328	.677417	.599176	-.93
33	-95.00	14271.	96	0.	0	251.328	.659379	.586795	-.86
34	-103.33	14134.	98	0.	0	251.328	.641003	.575199	-.82
35	-111.67	13982.	100	0.	0	251.328	.622310	.564174	-.85
36	-120.00	13809.	102	0.	0	251.328	.603448	.553251	-.94

39	-1[illegible]5,00	13150,	108	0,	0	[illegible]51,328	,547766	,518798	-1,27
40	[illegible],33	12871,	110	0,	0	[illegible]1,328	,532872	,506982	-1,27
41	-[illegible],67	12587,	112	0,	0	[illegible]1,328	,519795	,495226	-1,28
42	-170,00	12288,	114	0,	0	251,328	,506206	,483463	-1,36
43	-178,89	11854,	116	0,	0	251,328	,490154	,470140	-1,51
44	-187,78	11144,	117	0,	0	251,328	,473208	,455145	-1,60
45	-196,67	10266,	120	0,	0	251,328	,455943	,438546	-1,57
46	-205,56	10077,	124	0,	0	251,328	,436828	,421013	-1,49
47	-214,44	10038,	126	0,	0	251,328	,414512	,402751	-1,33
48	-223,33	9686,	129	0,	0	251,328	,390242	,383699	-1,10
49	-232,22	10063,	132	0,	0	251,328	,365502	,362974	-,83
50	-241,11	10240,	133	0,	0	251,328	,340500	,339985	-,48

PROB 6 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,50, UNIFORM WALL THICKNESS=2,0 IN, RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50,00

BLOWS/FT,	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ,IN,	SEG NO,	MAX T STRESS LBS/SQ,IN,	SEG NO,
1,52	50,	84,84	14011,	13	12427,	11
2,18	100,	162,84	14078,	16	11659,	12
3,09	150,	237,51	14250,	36	10897,	9
4,41	200,	308,09	14541,	31	10290,	9
5,70	250,	374,71	14546,	31	9404,	9
6,75	300,	437,69	14550,	30	8550,	8
7,88	350,	497,52	14553,	29	7819,	8
9,10	400,	555,75	14558,	29	7125,	8
10,50	450,	607,00	14563,	29	6461,	8
12,11	500,	657,28	14568,	28	5813,	8
13,97	550,	704,72	14574,	28	5182,	8
17,58	600,	749,57	14579,	28	4583,	8
18,91	650,	791,92	14585,	28	4016,	8
20,36	700,	831,88	14590,	27	3465,	8
21,95	750,	869,74	14597,	27	2437,	41
23,64	800,	905,56	14604,	27	1975,	41
25,53	850,	939,56	14611,	27	1529,	41
27,55	900,	971,77	14617,	27	1109,	41
29,81	950,	1002,20	14624,	27	703,	41
32,33	1000,	1030,95	14630,	27	313,	41
35,12	1050,	1057,83	14637,	27	0,	50
38,27	1100,	1083,04	14643,	27	0,	50
41,82	1150,	1107,06	14650,	26	0,	50
45,87	1200,	1129,42	14658,	26	0,	50
50,52	1250,	1149,99	14665,	26	0,	50
55,91	1300,	1168,67	14672,	26	0,	50
62,21	1350,	1185,60	14680,	26	0,	50
69,73	1400,	1208,95	14687,	26	0,	50
78,69	1450,	1223,03	14694,	26	0,	50
89,30	1500,	1242,94	14702,	26	0,	50
103,45	1550,	1260,31	14709,	26	0,	50
121,05	1600,	1268,65	14716,	26	0,	50
144,20	1650,	1284,05	14723,	26	0,	50
176,19	1700,	1296,25	14730,	26	0,	50
222,98	1750,	1292,85	14737,	26	0,	50
296,29	1800,	1286,74	14744,	26	0,	50
450,85	1650,	1276,05	14751,	26	0,	50

PRCH 6 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
250FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,30, UNIFORM WALL THICKNESS=2,0 IN, RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50,00

BLOWS PER FOOT	RESISTANCE TONS
144,20	1650,
176,19	1700,
245,77	1768,
296,29	1800,

Pile Driving Resistance Curves

Pile Diameter	- 36 in.
Minimum Wall Thickness	- 2.00 in. (Uniform)
Penetration	- 250 ft.
	- 200 ft.
Hammer	- Vulcan 060
Quake Factor, Tip	- .025 in.
	- .10 in.
	- .30 in.

5

6000 REMOTE BATCH

UNITED COMPUTING 67, APEX/3L 8.2.0

16.01.25. 05/25/76.

```
JJJJJJJJJJJJ  YY          YY  JJJJJJJJJJJJ    00000000    LL              NN          NN  RRRRRRRRRRR
JJJJJJJJJJJJ  YY          YY  JJJJJJJJJJJJ   00      00   LL              NNN         NN  RRRRRRRRRRRR
      JJ      YY          YY        JJ       00      00   LL              NNNN        NN  RR        RR
      JJ      YY          YY        JJ       00      00   LL              NN NN       NN  RR        RR
      JJ      YY          YY        JJ       00      00   LL              NN  NN      NN  RR        RR
      JJ      YY          YY        JJ       00      00   LL              NN   NN     NN  RR        RR
      JJ      YYY        YYY        JJ       00      00   LL              NN    NN    NN  RR        RR
      JJ       YYY      YYY         JJ       00      00   LL              NN     NN   NN  RRRRRRRRRRRR
      JJ        YYY    YYY          JJ       00      00   LL              NN      NNNNNN  RRRRRRRRRRR
      JJ          YYYY              JJ       00      00   LL              NN        NNNN  RR  RR
      JJ           YY               JJ       00      00   LL              NN          NN  RR   RR
      JJ           YY               JJ       00      00   LL              NN          NN  RR    RR
      JJ           YY               JJ       00      00   LL              NN          NN  RR     RR
JJ    JJ           YY         JJ    JJ       00      00   LL          LL  NN          NN  RR      RR
 JJJJJJJ           YY          JJJJJJ        00      00   LLLLLLLLLLLL   NN          NN  RR       RR
  JJJJJ            YY           JJJJJ         00000000    LLLLLLLLLLLL   NN          NN  RR        RR
```

5

WAVE EQUATION ANALYSIS FOR 36-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ICMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB
1   36-IN. DIAMETER PILES 3-PILE STRUCTURE
     250FT PENETRATION -- VULCAN 060 HAMMER
     QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN.   RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	36.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

```
NUMBER OF SECTIONS CHANGED           0
NUMBER OF SECTIONS ADDED             0
LENGTH OF FREE STANDING PILE(FT)     120.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2.000	90.	0	90
2	1	2.000	100.	90	190
3	1	2.000	100.	190	290
4	1	2.000	80.	290	370

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES      1
SIDE DAMPENING RESISTANCE  = JSIDE      .15
POINT DAMPENING RESISTANCE = JPONT      .15
SOIL QUAKE FOR SIDE        = QSIDE      .10
SOIL QUAKE FOR POINT       = QPOINT     .02
```

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 36-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0407 INCHES
NUMBER OF BLOWS PER FOOT = 295.03
TOTAL INTERVALS = 122

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4912798.	19	0.	47	1.000	1.323938	1.320897	-.40
2	0.00	3500155.	26	0.	0	1.000	1.003272	.967203	-1.15
3	120.00	16406.	28	0.	0	213.629	.982366	.941991	-1.25
4	111.00	16422.	30	0.	0	213.629	.970498	.926295	-1.36
5	102.00	16447.	33	0.	0	213.629	.957297	.909845	-1.45
6	93.00	16484.	35	0.	0	213.629	.942636	.892603	-1.53
7	84.00	16514.	37	0.	0	213.629	.926563	.874551	-1.60
8	75.00	16526.	39	0.	0	213.629	.909034	.855642	-1.65
9	66.00	16547.	41	0.	0	213.629	.890210	.835905	-1.70
10	57.00	16568.	43	0.	0	213.629	.870366	.815238	-1.71
11	48.00	16615.	46	0.	0	213.629	.850324	.793661	-1.71
12	39.00	16669.	48	0.	0	213.629	.832532	.771148	-1.69
13	30.00	16709.	50	0.	0	213.629	.816739	.747677	-1.65
14	21.67	16777.	52	0.	0	213.629	.801968	.725152	-1.60
15	13.33	16889.	54	0.	0	213.629	.786302	.701781	-1.52
16	5.00	17047.	56	0.	0	213.629	.769480	.677634	-1.44
17	-3.33	17201.	58	0.	0	213.629	.751127	.652821	-1.35
18	-11.67	17298.	60	0.	0	213.629	.731279	.627370	-1.24
19	-20.00	17337.	62	0.	0	213.629	.709968	.601483	-1.17
20	-28.33	17323.	65	0.	0	213.629	.687317	.575290	-1.10
21	-36.67	17259.	67	0.	0	213.629	.663456	.548841	-1.05
22	-45.00	17139.	69	0.	0	213.629	.638506	.522375	-1.04
23	-53.33	16964.	71	0.	0	213.629	.612570	.496025	-1.03
24	-61.67	16732.	73	0.	0	213.629	.585726	.469844	-1.03
25	-70.00	16446.	75	0.	0	213.629	.558070	.443991	-1.06
26	-78.33	16112.	77	0.	0	213.629	.529764	.418512	-1.10
27	-86.67	15729.	79	0.	0	213.629	.500989	.393338	-1.13
28	-95.00	15295.	81	0.	0	213.629	.472003	.368613	-1.18
29	-103.33	14815.	83	0.	0	213.629	.442914	.344441	-1.24
30	-111.67	14306.	86	0.	0	213.629	.413905	.320739	-1.30
31	-120.00	13764.	88	0.	0	213.629	.385106	.297518	-1.35
32	-128.33	13176.	90	0.	0	213.629	.356569	.274921	-1.45
33	-136.67	12525.	92	0.	0	213.629	.328681	.252831	-1.59
34	-145.00	11844.	94	0.	0	213.629	.301554	.231145	-1.69
35	-153.33	11104.	96	0.	0	213.629	.275069	.209810	-1.79
36	-161.67	10322.	99	0.	0	213.629	.249913	.189012	-1.79
37	-170.00	9511.	101	0.	0	213.629	.225378	.169648	-1.78

3	-187.78	8075.	103	0.	0	213.629	.175235	.131990	-1.67
40	196.67	7537.	108	0.	0	213.629	.150021	.114805	-1.48
41	-205.56	7099.	109	0.	0	213.629	.125338	.100600	-1.28
42	-214.44	6272.	109	0.	0	213.629	.103441	.088789	-1.08
43	-223.33	5574.	111	0.	0	213.629	.084980	.078911	-1.00
44	-232.22	4683.	112	0.	0	213.629	.072212	.069863	-.83
45	-241.11	3671.	115	0.	0	213.629	.060674	.059928	-.50

PROB 1 36-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN, RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.26	50.	26.29	16474.	7	14646.	9
2.96	100.	51.05	16574.	15	13814.	8
3.80	150.	74.40	16773.	22	12997.	8
4.62	200.	96.40	16868.	22	12023.	8
5.47	250.	117.07	16882.	21	11074.	7
6.31	300.	136.48	16893.	21	10243.	7
7.20	350.	154.75	16903.	21	9418.	7
8.20	400.	171.92	16913.	21	8650.	7
9.27	450.	188.07	16924.	20	7895.	7
12.55	500.	203.22	16935.	20	7170.	7
13.48	550.	217.45	16946.	20	6523.	6
14.29	600.	230.78	16958.	20	5934.	6
15.14	650.	243.28	16968.	20	5420.	6
16.05	700.	254.97	16979.	20	4837.	38
17.02	750.	265.90	16990.	20	4371.	38
18.05	800.	276.10	17000.	20	3922.	38
19.15	850.	285.62	17011.	20	3487.	38
20.33	900.	294.50	17021.	20	3080.	39
21.60	950.	302.76	17032.	20	2707.	39
22.97	1000.	310.42	17042.	20	2347.	39
24.44	1050.	317.52	17053.	20	1999.	39
26.03	1100.	324.10	17063.	20	1662.	39
27.74	1150.	330.18	17074.	20	1337.	39
29.60	1200.	335.76	17084.	20	1021.	39
31.63	1250.	340.88	17094.	20	710.	39
33.83	1300.	345.56	17105.	19	403.	39
36.27	1350.	349.81	17116.	19	123.	40
38.92	1400.	353.61	17126.	19	0.	45
41.86	1450.	356.97	17137.	19	0.	45
45.09	1500.	359.90	17148.	19	0.	45
48.69	1550.	362.32	17159.	19	0.	45
52.68	1600.	364.24	17169.	19	0.	45
57.17	1650.	365.65	17180.	19	0.	45
62.16	1700.	366.52	17191.	19	0.	45
67.86	1750.	366.94	17201.	19	0.	45
74.25	1800.	367.06	17212.	19	0.	45
81.60	1850.	367.07	17222.	19	0.	45
90.09	1900.	367.61	17233.	19	0.	45
99.70	1950.	368.98	17243.	19	0.	45
111.00	2000.	370.85	17254.	19	0.	45
123.93	2050.	373.07	17264.	19	0.	45
138.93	2100.	375.46	17275.	19	0.	45
155.71	2150.	378.09	17285.	19	0.	45

197.14	2250.	383.54	17306.	19	0.	45
222.93	2300.	386.35	17316.	19	0.	45
254.68	2350.	389.24	17327.	19	0.	45
295.03	2400.	392.13	17337.	19	0.	45
345.63	2450.	395.14	17347.	19	0.	45

PROB 1 36-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
138.93	2100.
197.14	2250.
254.68	2350.
295.03	2400.

[illegible] STEP PIPE [illegible]
[illegible] (continued)

[illegible] STEP PIPES 3 PIPE [illegible]
[illegible]

[illegible] DATA

[illegible]

TABLE 2 [illegible] DATA

[illegible] [illegible]

[illegible]	[illegible]	[illegible]	AREA	[illegible]	SPRING CONSTANT
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	LB / IN
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].00
2	[illegible]	[illegible]	[illegible]	[illegible]	0.00

[illegible] DATA

[illegible] = 1

[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]

[illegible]

PROB 2 36-IN. DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	57363289.
3	120.00	0.00	6542.38	213.63	1.00	57363289.
4	111.00	0.00	6542.38	213.63	1.00	57363289.
5	102.00	0.00	6542.38	213.63	1.00	57363289.
6	93.00	0.00	6542.38	213.63	1.00	57363289.
7	84.00	0.00	6542.38	213.63	1.00	57363289.
8	75.00	0.00	6542.38	213.63	1.00	57363289.
9	66.00	0.00	6542.38	213.63	1.00	57363289.
10	57.00	0.00	6542.38	213.63	1.00	57363289.
11	48.00	0.00	6542.38	213.63	1.00	57363289.
12	39.00	0.00	6542.38	213.63	1.00	57363289.
13	30.00	0.00	6057.76	213.63	1.00	61952352.
14	21.67	0.00	6057.76	213.63	1.00	61952352.
15	13.33	0.00	6057.76	213.63	1.00	61952352.
16	5.00	0.00	6057.76	213.63	1.00	61952352.
17	-3.33	0.00	6057.76	213.63	1.00	61952352.
18	-11.67	0.00	6057.76	213.63	1.00	61952352.
19	-20.00	0.00	6057.76	213.63	1.00	61952352.
20	-28.33	0.00	6057.76	213.63	1.00	61952352.
21	-36.67	0.00	6057.76	213.63	1.00	61952352.
22	-45.00	0.00	6057.76	213.63	1.00	61952352.
23	-53.33	0.00	6057.76	213.63	1.00	61952352.
24	-61.67	0.00	6057.76	213.63	1.00	61952352.
25	-70.00	0.00	6057.76	213.63	1.00	61952352.
26	-78.33	0.00	6057.76	213.63	1.00	61952352.
27	-86.67	0.00	6057.76	213.63	1.00	61952352.
28	-95.00	0.00	6057.76	213.63	1.00	61952352.
29	-103.33	0.00	6057.75	213.63	1.00	61952352.
30	-111.67	0.00	6057.76	213.63	1.00	61952352.
31	-120.00	0.00	6057.76	213.63	1.00	61952352.
32	-128.33	0.00	6057.76	213.63	1.00	61952352.
33	-136.67	0.00	6057.76	213.63	1.00	61952352.
34	-145.00	0.00	6057.76	213.63	1.00	61952352.
35	-153.33	0.00	6057.76	213.63	1.00	61952352.
36	-161.67	0.00	6057.76	213.63	1.00	61952352.
37	-170.00	0.00	6461.61	213.63	1.00	58080330.
38	-178.89	0.00	6461.61	213.63	1.00	58080330.
39	-187.78	0.00	6461.61	213.63	1.00	58080330.
40	-196.67	0.00	6461.61	213.63	1.00	58080330.
41	-205.56	0.00	6461.61	213.63	1.00	58080330.
42	-214.44	0.00	6461.61	213.63	1.00	58080330.
43	-223.33	0.00	6461.61	213.63	1.00	58080330.
44	-232.22	0.00	6461.61	213.63	1.00	58080330.
45	-241.11	1000.00	6461.61	213.63	1.00	58080330.

PROB 2 36-IN, DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN, RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0403 INCHES
NUMBER OF BLOWS PER FOOT = 297.57
TOTAL INTERVALS = 124

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4912798.	19	0.	47	1.000	1.348906	1.348250	-.18
2	0.00	3500166.	26	0.	0	1.000	1.024619	1.002681	-.72
3	120.00	16406.	28	0.	0	213.629	1.005637	.980399	-.81
4	111.00	16422.	30	0.	0	213.629	.996236	.968162	-.89
5	102.00	16447.	33	0.	0	213.629	.985759	.955381	-.98
6	93.00	16484.	35	0.	0	213.629	.974206	.942023	-1.06
7	84.00	16514.	37	0.	0	213.629	.961382	.928040	-1.12
8	75.00	16526.	39	0.	0	213.629	.947288	.913420	-1.18
9	66.00	16547.	41	0.	0	213.629	.931968	.898034	-1.23
10	57.00	16568.	43	0.	0	213.629	.915281	.881941	-1.26
11	48.00	16615.	46	0.	0	213.629	.897450	.864924	-1.27
12	39.00	16668.	48	0.	0	213.629	.878419	.847048	-1.28
13	30.00	16702.	50	0.	0	213.629	.858499	.828192	-1.26
14	21.67	16756.	52	0.	0	213.629	.839761	.809863	-1.24
15	13.33	16836.	54	0.	0	213.629	.823587	.790624	-1.19
16	5.00	16947.	56	0.	0	213.629	.808858	.770403	-1.12
17	-3.33	17056.	58	0.	0	213.629	.793542	.749274	-1.05
18	-11.67	17127.	60	0.	0	213.629	.777478	.727305	-.98
19	-20.00	17162.	62	0.	0	213.629	.760539	.704544	-.91
20	-28.33	17160.	64	0.	0	213.629	.742577	.681222	-.87
21	-36.67	17122.	66	0.	0	213.629	.723638	.657469	-.83
22	-45.00	17046.	68	0.	0	213.629	.703798	.633452	-.81
23	-53.33	16938.	71	0.	0	213.629	.683134	.609494	-.82
24	-61.67	16799.	73	0.	0	213.629	.661727	.585730	-.85
25	-70.00	16625.	75	0.	0	213.629	.639652	.562170	-.90
26	-78.33	16417.	77	0.	0	213.629	.616934	.539003	-.97
27	-86.67	16175.	79	0.	0	213.629	.593583	.516346	-1.03
28	-95.00	15899.	81	0.	0	213.629	.569660	.494170	-1.09
29	-103.33	15593.	83	0.	0	213.629	.545522	.472553	-1.16
30	-111.67	15260.	85	0.	0	213.629	.521058	.451638	-1.21
31	-120.00	14902.	87	0.	0	213.629	.496346	.431448	-1.27
32	-128.33	14509.	89	0.	0	213.629	.471829	.411884	-1.32
33	-136.67	14067.	91	0.	0	213.629	.447429	.392955	-1.44
34	-145.00	13602.	93	0.	0	213.629	.423219	.374337	-1.62
35	-153.33	13111.	95	0.	0	213.629	.399467	.355451	-1.81
36	-161.67	12561.	98	0.	0	213.629	.376283	.335890	-2.00
37	-170.00	12030.	100	0.	0	213.629	.353972	.315725	-2.13

39	187,78	10818,	102	0,	0	213,629	,307064	,271712	-2,06
40	96,67	10138,	104	0,	0	213,629	,280784	,249286	-1,92
41	05,56	10013,	111	0,	0	213,629	,251932	,226730	-1,67
42	-214,44	10133,	113	0,	0	213,629	,221745	,204971	-1,38
43	-223,33	9962,	111	0,	0	213,629	,191879	,183990	-1,15
44	-232,22	9648,	114	0,	0	213,629	,165159	,162142	-,82
45	-241,11	8580,	115	0,	0	213,629	,140326	,140058	-,47

PROB 2 36-IN. DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.91	50.	65.56	16518.	12	14517.	8
2.83	100.	127.06	16613.	15	13632.	8
3.81	150.	184.80	16834.	24	12749.	8
4.70	200.	238.96	16880.	23	11655.	8
5.65	250.	289.72	16885.	22	10570.	8
6.60	300.	337.27	16891.	22	9636.	7
7.63	350.	381.91	16897.	22	8755.	7
8.78	400.	423.77	16904.	21	7899.	7
10.05	450.	463.06	16912.	21	7095.	7
13.44	500.	499.88	16919.	21	6331.	7
14.65	550.	534.38	16926.	21	5663.	6
15.69	600.	566.72	16934.	21	5086.	6
16.75	650.	597.00	16941.	20	3756.	9
17.89	700.	625.32	16949.	20	3148.	37
19.12	750.	651.81	16957.	20	2605.	37
20.44	800.	676.53	16965.	20	2081.	37
21.87	850.	699.60	16973.	20	1596.	38
23.43	900.	721.12	16981.	20	1145.	38
25.12	950.	741.17	16989.	20	714.	38
26.97	1000.	759.74	16997.	20	296.	38
28.98	1050.	776.97	17005.	20	0.	45
31.20	1100.	792.97	17013.	20	0.	45
33.65	1150.	807.79	17021.	20	0.	45
36.35	1200.	821.35	17029.	20	0.	45
39.33	1250.	833.81	17037.	20	0.	45
42.69	1300.	845.23	17045.	20	0.	45
46.45	1350.	855.70	17053.	20	0.	45
50.67	1400.	865.27	17061.	20	0.	45
55.52	1450.	873.93	17069.	20	0.	45
61.00	1500.	881.92	17077.	20	0.	45
67.40	1550.	889.25	17084.	20	0.	45
74.75	1600.	896.00	17092.	20	0.	45
83.48	1650.	902.02	17100.	20	0.	45
93.73	1700.	907.43	17107.	20	0.	45
106.21	1750.	912.32	17115.	20	0.	45
121.27	1800.	916.08	17123.	20	0.	45
140.02	1850.	918.68	17130.	20	0.	45
164.10	1900.	919.90	17138.	19	0.	45
194.88	1950.	919.37	17146.	19	0.	45
237.51	2000.	918.10	17154.	19	0.	45
297.57	2050.	916.42	17162.	19	0.	45
388.09	2100.	926.55	17170.	19	0.	45

PROB 2 36-IN. DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
140.02	1850.
194.88	1950.
237.51	2000.
297.57	2050.

```
WAVE EQUATION ANALYSIS FOR 36-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

 PROB
   3      36-IN. DIAMETER PILES 3-PILE STRUCTUR
          250FT PENETRATION -- VULCAN 060 HAMMER
          QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN.      RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                           1
     NEW HAMMER DATA OPTION              1
     NEW MATERIAL DATA OPTION            1
     NEW PILE SECTION DATA OPTION        1
     NEW SOIL DATA OPTION                1
     SPECIFIED BLOW COUNT OPTION         1
     OUTPUT OPTION FOR STRESS            1
     BPF FOR STRESS OUTPUT OPTION                     275.
     ULTIMATE RESISTANCE INCREMENT (TONS)             50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)        300.
     SPECIFIED SEGMENT LENGTH (FT)                    -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION            VULCAN 060 HAMMER
     HAMMER EFFICIENCY                    .75
     HAMMER ENERGY (FT-LBS)       300000.00
     HAMMER EXPLOSIVE FORCE (LBS)      -0.00
     NUMBER OF HAMMER SEGMENTS             2

     SEGMENT     SLACK      WEIGHT     AREA    COEF OF     SPRING CONSTANT
      NUMBER     (IN)        (LB)    (SQ IN) RESTITUTION     (LB / IN)

         1      1000.00  60000.00     1.00       .60       9200000.00
         2      1000.00  02000.00     1.00       .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =    1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

             1        36.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

```
NUMBER OF SECTIONS CHANGED          0
NUMBER OF SECTIONS ADDED            0
LENGTH OF FREE STANDING PILE(FT)    120.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2.000	90.	0	90
2	1	2.000	100.	90	190
3	1	2.000	100.	190	290
4	1	2.000	80.	290	370

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES   1
SIDE DAMPENING RESISTANCE  = JSIDE    .15
POINT DAMPENING RESISTANCE = JPONT    .15
SOIL QUAKE FOR SIDE        = QSIDE    .10
SOIL QUAKE FOR POINT       = QPOINT   .30
```

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 3 36-IN. DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	57363289.
3	120.00	0.00	6542.38	213.63	1.00	57363289.
4	111.00	0.00	6542.38	213.63	1.00	57363289.
5	102.00	0.00	6542.38	213.63	1.00	57363289.
6	93.00	0.00	6542.38	213.63	1.00	57363289.
7	84.00	0.00	6542.38	213.63	1.00	57363289.
8	75.00	0.00	6542.38	213.63	1.00	57363289.
9	66.00	0.00	6542.38	213.63	1.00	57363289.
10	57.00	0.00	6542.38	213.63	1.00	57363289.
11	48.00	0.00	6542.38	213.63	1.00	57363289.
12	39.00	0.00	6542.38	213.63	1.00	57363289.
13	30.00	0.00	6057.76	213.63	1.00	61952352.
14	21.67	0.00	6057.76	213.63	1.00	61952352.
15	13.33	0.00	6057.76	213.63	1.00	61952352.
16	5.00	0.00	6057.76	213.63	1.00	61952352.
17	-3.33	0.00	6057.76	213.63	1.00	61952352.
18	-11.67	0.00	6057.76	213.63	1.00	61952352.
19	-20.00	0.00	6057.76	213.63	1.00	61952352.
20	-28.33	0.00	6057.76	213.63	1.00	61952352.
21	-36.67	0.00	6057.76	213.63	1.00	61952352.
22	-45.00	0.00	6057.76	213.63	1.00	61952352.
23	-53.33	0.00	6057.76	213.63	1.00	61952352.
24	-61.67	0.00	6057.76	213.63	1.00	61952352.
25	-70.00	0.00	6057.76	213.63	1.00	61952352.
26	-78.33	0.00	6057.76	213.63	1.00	61952352.
27	-86.67	0.00	6057.76	213.63	1.00	61952352.
28	-95.00	0.00	6057.76	213.63	1.00	61952352.
29	-103.33	0.00	6057.76	213.63	1.00	61952352.
30	-111.67	0.00	6057.76	213.63	1.00	61952352.
31	-120.00	0.00	6057.76	213.63	1.00	61952352.
32	-128.33	0.00	6057.76	213.63	1.00	61952352.
33	-136.67	0.00	6057.76	213.63	1.00	61952352.
34	-145.00	0.00	6057.76	213.63	1.00	61952352.
35	-153.33	0.00	6057.76	213.63	1.00	61952352.
36	-161.67	0.00	6057.76	213.63	1.00	61952352.
37	-170.00	0.00	6461.61	213.63	1.00	58080330.
38	-178.89	0.00	6461.61	213.63	1.00	58080330.
39	-187.78	0.00	6461.61	213.63	1.00	58080330.
40	-196.67	0.00	6461.61	213.63	1.00	58080330.
41	-205.56	0.00	6461.61	213.63	1.00	58080330.
42	-214.44	0.00	6461.61	213.63	1.00	58080330.
43	-223.33	0.00	6461.61	213.63	1.00	58080330.
44	-232.22	0.00	6461.61	213.63	1.00	58080330.
45	-241.11	1000.00	6461.61	213.63	1.00	58080330.

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 120.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2.000	90.	0	90
2	1	2.000	100.	90	190
3	1	2.000	100.	190	290
4	1	2.000	80.	290	370

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

3[illegible]	-187.78	13004.	102	0.	0	213.629	.475120	.464069	-1.33
4[illegible]	-196.67	12260.	104	0.	0	213.629	.456951	.446588	-1.49
41	-205.56	11198.	105	0.	0	213.629	.437404	.426670	-1.45
42	-214.44	10749.	111	0.	0	213.629	.415271	.405236	-1.21
43	-223.33	10799.	112	0.	0	213.629	.389749	.383200	-.98
44	-232.22	10973.	117	0.	0	213.629	.363085	.360121	-.86
45	-241.11	11479.	118	0.	0	213.629	.336072	.335130	-.58

PROB 3 36-IN. DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

STIPS,30 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 50

TABLE 5 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0341 INCHES
NUMBER OF BLOWS PER FOOT = 332.67
TOTAL INTERVALS = 128

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4912798.	19	0.	47	1.000	1.383471	1.383258	-.10
2	0.00	3520166.	26	0.	0	1.000	1.054651	1.042607	-.39
3	120.00	16406.	28	0.	0	213.629	1.037213	1.022239	-.45
4	111.00	16422.	30	0.	0	213.629	1.029971	1.012402	-.53
5	102.00	16437.	33	0.	0	213.629	1.021963	1.002216	-.60
6	93.00	16034.	35	0.	0	213.629	1.013105	.991667	-.67
7	84.00	15514.	37	0.	0	213.629	1.003340	.980741	-.74
8	75.00	16526.	39	0.	0	213.629	.992668	.969371	-.79
9	66.00	16527.	41	0.	0	213.629	.980938	.957571	-.85
10	57.00	16568.	43	0.	0	213.629	.968164	.945165	-.88
11	48.00	16615.	46	0.	0	213.629	.954362	.932207	-.93
12	39.00	16667.	48	0.	0	213.629	.939453	.918535	-.94
13	30.00	16698.	50	0.	0	213.629	.923482	.904102	-.94
14	21.67	16740.	52	0.	0	213.629	.907777	.889047	-.93
15	13.33	16799.	54	0.	0	213.629	.891192	.875216	-.90
16	5.00	16877.	56	0.	0	213.629	.873687	.859592	-.86
17	-3.33	16953.	58	0.	0	213.629	.855431	.843069	-.80
18	-11.67	17009.	60	0.	0	213.629	.836551	.825377	-.73
19	-20.00	17037.	62	0.	0	213.629	.818559	.807237	-.66
20	-28.33	17045.	64	0.	0	213.629	.803702	.788087	-.58
21	-36.67	17030.	66	0.	0	213.629	.788560	.768252	-.51
22	-45.00	16985.	68	0.	0	213.629	.773051	.747951	-.46
23	-53.33	16933.	70	0.	0	213.629	.756982	.727270	-.43
24	-61.67	16851.	72	0.	0	213.629	.740320	.706386	-.42
25	-70.00	16745.	74	0.	0	213.629	.723060	.685629	-.44
26	-78.33	16627.	76	0.	0	213.629	.705234	.665129	-.46
27	-86.67	16472.	78	0.	0	213.629	.686936	.645036	-.49
28	-95.00	16305.	81	0.	0	213.629	.668271	.625723	-.49
29	-103.33	16121.	83	0.	0	213.629	.649265	.607426	-.46
30	-111.67	15922.	85	0.	0	213.629	.629931	.590360	-.40
31	-120.00	15705.	87	0.	0	213.629	.610569	.574810	-.36
32	-128.33	15467.	89	0.	0	213.629	.590953	.560683	-.37
33	-136.67	15190.	91	0.	0	213.629	.571393	.547490	-.86
34	-145.00	14897.	93	0.	0	213.629	.551000	.534577	-.45
35	-153.33	14578.	95	0.	0	213.629	.533594	.521491	-.97
36	-161.67	14225.	97	0.	0	213.629	.519369	.508196	-1.02
37	-170.00	13881.	99	0.	0	213.629	.506822	.494608	-1.09
38	-178.33	13572.	101	0.	0	213.629	.491894	.479719	-1.15
[illegible]	[illegible]	[illegible]	103	0.	0	213.629	[illegible]	[illegible]	[illegible]

PROB 3 36-IN, DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN, RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.64	50.	93.51	16554.	14	14452.	19
2.38	100.	180.95	16641.	15	13492.	8
3.51	150.	262.80	16855.	27	12547.	8
4.81	200.	339.39	16895.	25	11377.	8
5.92	250.	411.10	16895.	24	10312.	8
7.08	300.	478.17	16896.	23	9305.	8
8.39	350.	540.92	16898.	23	8357.	7
9.93	400.	599.70	16902.	22	7437.	7
14.21	450.	654.91	16906.	22	6613.	7
15.83	500.	706.66	16910.	22	5809.	7
17.65	550.	755.28	16915.	21	5029.	7
19.33	600.	800.58	16921.	21	4329.	7
20.99	650.	843.59	16926.	21	3028.	11
22.82	700.	883.61	16931.	21	2076.	37
24.84	750.	920.87	16937.	21	1493.	37
27.08	800.	955.54	16942.	21	927.	37
29.58	850.	987.85	16947.	21	388.	37
32.37	900.	1017.31	16953.	21	0.	45
35.55	950.	1044.68	16958.	20	0.	45
39.14	1000.	1069.65	16965.	20	0.	45
43.27	1050.	1092.48	16971.	20	0.	45
48.03	1100.	1113.77	16977.	20	0.	45
53.58	1150.	1143.28	16983.	20	0.	45
60.11	1200.	1168.37	16990.	20	0.	45
67.87	1250.	1189.60	16996.	20	0.	45
77.35	1300.	1214.50	17002.	20	0.	45
88.96	1350.	1221.92	17008.	20	0.	45
103.64	1400.	1239.65	17014.	20	0.	45
122.80	1450.	1242.25	17021.	20	0.	45
148.33	1500.	1245.39	17027.	20	0.	45
185.04	1550.	1248.54	17033.	20	0.	45
239.68	1600.	1235.80	17039.	20	0.	45
332.67	1650.	1226.13	17045.	20	0.	45

PROB 3 36-IN. DIAMETER PILES 3-PILE STRUCTUR
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
148.33	1500.
185.04	1550.
239.68	1600.
293.25	1632.

WAVE EQUATION ANALYSIS FOR 36-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PRCB
4
36-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER
QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN.   RU = 18

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	36.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS = 4

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 120.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	2.000	90.	0	90
2	1	2.000	100.	90	190
3	1	2.000	50.	190	240
4	1	2.000	80.	240	320

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .02

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 36-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	57363289.
3	120.00	0.00	6542.38	213.63	1.00	57363289.
4	111.00	0.00	6542.38	213.63	1.00	57363289.
5	102.00	0.00	6542.38	213.63	1.00	57363289.
6	93.00	0.00	6542.38	213.63	1.00	57363289.
7	84.00	0.00	6542.38	213.63	1.00	57363289.
8	75.00	0.00	6542.38	213.63	1.00	57363289.
9	66.00	0.00	6542.38	213.63	1.00	57363289.
10	57.00	0.00	6542.38	213.63	1.00	57363289.
11	48.00	0.00	6542.38	213.63	1.00	57363289.
12	39.00	0.00	6542.38	213.63	1.00	57363289.
13	30.00	0.00	6057.76	213.63	1.00	61952352.
14	21.67	0.00	6057.76	213.63	1.00	61952352.
15	13.33	0.00	6057.76	213.63	1.00	61952352.
16	5.00	0.00	6057.76	213.63	1.00	61952352.
17	-3.33	0.00	6057.76	213.63	1.00	61952352.
18	-11.67	0.00	6057.76	213.63	1.00	61952352.
19	-20.00	0.00	6057.76	213.63	1.00	61952352.
20	-28.33	0.00	6057.76	213.63	1.00	61952352.
21	-36.67	0.00	6057.76	213.63	1.00	61952352.
22	-45.00	0.00	6057.76	213.63	1.00	61952352.
23	-53.33	0.00	6057.76	213.63	1.00	61952352.
24	-61.67	0.00	6057.76	213.63	1.00	61952352.
25	-70.00	0.00	6057.76	213.63	1.00	61952352.
26	-78.33	0.00	6057.76	213.63	1.00	61952352.
27	-86.67	0.00	6057.76	213.63	1.00	61952352.
28	-95.00	0.00	6057.76	213.63	1.00	61952352.
29	-103.33	0.00	6057.76	213.63	1.00	61952352.
30	-111.67	0.00	6057.76	213.63	1.00	61952352.
31	-120.00	0.00	6461.61	213.63	1.00	58080330.
32	-128.89	0.00	6461.61	213.63	1.00	58080330.
33	-137.78	0.00	6461.61	213.63	1.00	58080330.
34	-146.67	0.00	6461.61	213.63	1.00	58080330.
35	-155.56	0.00	6461.61	213.63	1.00	58080330.
36	-164.44	0.00	6461.61	213.63	1.00	58080330.
37	-173.33	0.00	6461.61	213.63	1.00	58080330.
38	-182.22	0.00	6461.61	213.63	1.00	58080330.
39	-191.11	1000.00	6461.61	213.63	1.00	58080330.

PROB 4 36-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0418 INCHES
NUMBER OF BLOWS PER FOOT = 286.96
TOTAL INTERVALS = 111

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4912798.	19	0.	47	1.000	1.299274	1.299274	-.05
2	0.00	3500166.	26	0.	0	1.000	.981060	.962401	-1.10
3	120.00	16406.	28	0.	0	213.629	.957281	.935722	-1.21
4	111.00	16422.	30	0.	0	213.629	.942134	.917875	-1.31
5	102.00	16447.	33	0.	0	213.629	.925464	.898631	-1.39
6	93.00	16484.	35	0.	0	213.629	.907270	.877946	-1.46
7	84.00	16514.	37	0.	0	213.629	.887829	.855798	-1.52
8	75.00	16526.	39	0.	0	213.629	.867619	.832238	-1.57
9	66.00	16547.	41	0.	0	213.629	.848085	.807182	-1.59
10	57.00	16569.	43	0.	0	213.629	.831012	.780784	-1.61
11	48.00	16615.	46	0.	0	213.629	.815426	.753004	-1.59
12	39.00	16671.	48	0.	0	213.629	.799663	.724103	-1.59
13	30.00	16719.	50	0.	0	213.629	.782645	.694204	-1.56
14	21.67	16815.	52	0.	0	213.629	.765434	.665871	-1.56
15	13.33	16980.	54	0.	0	213.629	.746253	.637144	-1.56
16	5.00	17220.	56	0.	0	213.629	.725097	.608195	-1.55
17	-3.33	17451.	58	0.	0	213.629	.701656	.579338	-1.56
18	-11.67	17605.	61	0.	0	213.629	.676227	.550798	-1.57
19	-20.00	17561.	63	0.	0	213.629	.648836	.522462	-1.58
20	-28.33	17424.	65	0.	0	213.629	.619670	.494342	-1.59
21	-36.67	17493.	67	0.	0	213.629	.588939	.466505	-1.60
22	-45.00	17255.	69	0.	0	213.629	.556886	.438855	-1.61
23	-53.33	16953.	71	0.	0	213.629	.523835	.411318	-1.63
24	-61.67	16561.	73	0.	0	213.629	.490174	.383967	-1.65
25	-70.00	16085.	75	0.	0	213.629	.456181	.356806	-1.68
26	-78.33	15533.	78	0.	0	213.629	.422044	.329664	-1.74
27	-86.67	14895.	80	0.	0	213.629	.388193	.302630	-1.79
28	-95.00	14202.	82	0.	0	213.629	.354912	.275798	-1.80
29	-103.33	13411.	84	0.	0	213.629	.322294	.249065	-1.87
30	-111.67	12522.	86	0.	0	213.629	.290565	.223121	-1.82
31	-120.00	11638.	89	0.	0	213.629	.260033	.198146	-1.76
32	-128.89	10452.	92	0.	0	213.629	.228263	.173303	-1.68
33	-137.78	9643.	94	0.	0	213.629	.196875	.149685	-1.61
34	-146.67	9019.	97	0.	0	213.629	.166070	.128395	-1.33
35	-155.56	8293.	97	0.	0	213.629	.136395	.109453	-1.19
36	-164.44	7314.	97	0.	0	213.629	.110490	.093982	-1.15
37	-173.33	6079.	99	0.	0	213.629	.089392	.080811	-1.06
38	-182.22	[illegible]	99	0.	0	213.629	[illegible]	[illegible]	[illegible]

39	-191.11	3772.	102	0.	0	213.629	.061818	.059768	-.69

PROB 4 36-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.23	50.	26.17	16462.	7	14549.	8
3.10	100.	50.80	16561.	13	13680.	8
4.02	150.	74.00	16823.	21	12780.	8
4.85	200.	95.85	16879.	20	11751.	7
5.66	250.	116.37	16899.	20	10833.	7
6.51	300.	135.65	16918.	20	9919.	7
7.44	350.	153.76	16936.	20	9065.	7
8.47	400.	170.79	16953.	20	8222.	7
9.62	450.	186.77	16971.	20	7478.	6
12.84	500.	201.77	16988.	20	6858.	6
13.74	550.	215.85	17005.	20	6208.	6
14.56	600.	229.05	17022.	20	5635.	6
15.42	650.	241.42	17039.	19	5056.	6
16.34	700.	253.00	17056.	19	4464.	6
17.31	750.	263.82	17074.	19	3547.	32
18.35	800.	273.94	17091.	19	3063.	32
19.46	850.	283.39	17108.	19	2609.	33
20.65	900.	292.22	17126.	19	2192.	33
21.92	950.	300.43	17143.	19	1787.	33
23.28	1000.	308.07	17160.	19	1399.	33
24.75	1050.	315.17	17177.	19	1037.	34
26.34	1100.	321.77	17194.	19	708.	34
28.04	1150.	327.89	17211.	19	389.	34
29.88	1200.	333.54	17228.	19	77.	34
31.89	1250.	338.74	17245.	19	0.	39
34.06	1300.	343.55	17261.	19	0.	39
36.45	1350.	347.93	17278.	19	0.	39
39.04	1400.	351.91	17294.	19	0.	39
41.91	1450.	355.47	17311.	19	0.	39
45.04	1500.	358.65	17327.	19	0.	39
48.54	1550.	361.33	17344.	19	0.	39
52.37	1600.	363.52	17360.	19	0.	39
56.68	1650.	365.27	17376.	19	0.	39
61.44	1700.	366.43	17394.	19	0.	39
66.80	1750.	367.10	17412.	19	0.	39
72.84	1800.	367.46	17430.	19	0.	39
79.63	1850.	367.77	17448.	19	0.	39
87.42	1900.	368.30	17467.	19	0.	39
96.16	1950.	369.70	17485.	19	0.	39
106.24	2000.	372.39	17503.	19	0.	39
117.79	2050.	375.49	17520.	19	0.	39
130.81	2100.	378.60	17538.	19	0.	39
145.72	2150.	381.89	17556.	19	0.	39
[illegible]	2200.	[illegible]	[illegible]	19	0.	39

179.76	2250.	388.70	17591.	19	0.	39
200.53	2300.	392.13	17609.	9	0.	39
224.22	2350.	395.67	17627.	9	0.	39
252.32	2400.	399.30	17644.	19	0.	39
286.96	2450.	402.88	17661.	19	0.	39
330.36	2500.	406.56	17679.	19	0.	39

PROB 4 36-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=2.0 IN. RU = 18

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
130.81	2100.
179.76	2250.
252.32	2400.
286.96	2450.

WAVE EQUATION ANALYSIS FOR 36-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB	
5	36-IN. DIAMETER PILES 3-PILE STRUCTUR 200FT PENETRATION -- VULCAN 060 HAMMER QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	36.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF PILE SECTIONS

```
NUMBER OF SECTIONS CHANGED          0
NUMBER OF SECTIONS ADDED            0
LENGTH OF FREE STANDING PILE(FT)    120.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	2.000	90.	0	90
2	1	2.000	100.	90	190
3	1	2.000	50.	190	240
4	1	2.000	80.	240	320

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES     1
SIDE DAMPENING RESISTANCE  = JSIDE       .15
POINT DAMPENING RESISTANCE = JPONT       .15
SOIL QUAKE FOR SIDE        = QSIDE       .10
SOIL QUAKE FOR POINT       = QPOINT      .10
```

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 5 36-IN, DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=,10 ,MINIMUM WALL THICKNESS=2,0 IN, RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0,00	1000,00	60000,00	1,00	,60	9200000.
2	0,00	1000,00	42000,00	1,00	,90	57363289.
3	120,00	0,00	6542,38	213,63	1,00	57363289.
4	111,00	0,00	6542,38	213,63	1,00	57363289.
5	102,00	0,00	6542,38	213,63	1,00	57363289.
6	93,00	0,00	6542,38	213,63	1,00	57363289.
7	84,00	0,00	6542,38	213,63	1,00	57363289.
8	75,00	0,00	6542,38	213,63	1,00	57363289.
9	66,00	0,00	6542,38	213,63	1,00	57363289.
10	57,00	0,00	6542,38	213,63	1,00	57363289.
11	48,00	0,00	6542,38	213,63	1,00	57363289.
12	39,00	0,00	6542,38	213,63	1,00	57363289.
13	30,00	0,00	6057,76	213,63	1,00	61952352.
14	21,67	0,00	6057,76	213,63	1,00	61952352.
15	13,33	0,00	6057,76	213,63	1,00	61952352.
16	5,00	0,00	6057,76	213,63	1,00	61952352.
17	-3,33	0,00	6057,76	213,63	1,00	61952352.
18	-11,67	0,00	6057,76	213,63	1,00	61952352.
19	-20,00	0,00	6057,76	213,63	1,00	61952352.
20	-28,33	0,00	6057,76	213,63	1,00	61952352.
21	-36,67	0,00	6057,76	213,63	1,00	61952352.
22	-45,00	0,00	6057,76	213,63	1,00	61952352.
23	-53,33	0,00	6057,76	213,63	1,00	61952352.
24	-61,67	0,00	6057,76	213,63	1,00	61952352.
25	-70,00	0,00	6057,76	213,63	1,00	61952352.
26	-78,33	0,00	6057,76	213,63	1,00	61952352.
27	-86,67	0,00	6057,76	213,63	1,00	61952352.
28	-95,00	0,00	6057,76	213,63	1,00	61952352.
29	-103,33	0,00	6057,76	213,63	1,00	61952352.
30	-111,67	0,00	6057,76	213,63	1,00	61952352.
31	-120,00	0,00	6461,61	213,63	1,00	58080330.
32	-128,89	0,00	6461,61	213,63	1,00	58080330.
33	-137,78	0,00	6461,61	213,63	1,00	58080330.
34	-146,67	0,00	6461,61	213,63	1,00	58080330.
35	-155,56	0,00	6461,61	213,63	1,00	58080330.
36	-164,44	0,00	6461,61	213,63	1,00	58080330.
37	-173,33	0,00	6461,61	213,63	1,00	58080330.
38	-182,22	0,00	6461,61	213,63	1,00	58080330.
39	-191,11	1000,00	6461,61	213,63	1,00	58080330.

PROB 5 36-IN. DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0427 INCHES
NUMBER OF BLOWS PER FOOT = 281.08
TOTAL INTERVALS = 116

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4912798.	19	0.	47	1.000	1.319973	1.319973	-.04
2	0.00	3500166.	26	0.	0	1.000	.999493	.980529	-.89
3	120.00	16406.	28	0.	0	213.629	.978466	.956933	-.99
4	111.00	16422.	30	0.	0	213.629	.966435	.942694	-1.08
5	102.00	16447.	33	0.	0	213.629	.953059	.927509	-1.16
6	93.00	16484.	35	0.	0	213.629	.938213	.911296	-1.23
7	84.00	16514.	37	0.	0	213.629	.921943	.894031	-1.29
8	75.00	16526.	39	0.	0	213.629	.904208	.875629	-1.31
9	66.00	16547.	41	0.	0	213.629	.885257	.856073	-1.34
10	57.00	16568.	43	0.	0	213.629	.865289	.835380	-1.33
11	48.00	16615.	46	0.	0	213.629	.845375	.813480	-1.32
12	39.00	16669.	48	0.	0	213.629	.828011	.790393	-1.29
13	30.00	16709.	50	0.	0	213.629	.812281	.766056	-1.24
14	21.67	16779.	52	0.	0	213.629	.797431	.742604	-1.19
15	13.33	16893.	54	0.	0	213.629	.781611	.718318	-1.14
16	5.00	17055.	56	0.	0	213.629	.764619	.693326	-1.10
17	-3.33	17212.	58	0.	0	213.629	.746062	.667845	-1.09
18	-11.67	17310.	60	0.	0	213.629	.725939	.641978	-1.07
19	-20.00	17349.	62	0.	0	213.629	.704293	.615999	-1.08
20	-28.33	17336.	65	0.	0	213.629	.681267	.590146	-1.12
21	-36.67	17269.	67	0.	0	213.629	.657012	.564410	-1.14
22	-45.00	17144.	69	0.	0	213.629	.631713	.539005	-1.16
23	-53.33	16963.	71	0.	0	213.629	.605523	.514107	-1.22
24	-61.67	16727.	73	0.	0	213.629	.578502	.489597	-1.26
25	-70.00	16441.	75	0.	0	213.629	.550779	.465436	-1.36
26	-78.33	16100.	77	0.	0	213.629	.522675	.441389	-1.54
27	-86.67	15685.	79	0.	0	213.629	.494395	.417031	-1.74
28	-95.00	15219.	81	0.	0	213.629	.466167	.392177	-1.94
29	-103.33	14694.	83	0.	0	213.629	.437983	.366899	-2.07
30	-111.67	14112.	86	0.	0	213.629	.410249	.341761	-2.14
31	-120.00	13537.	88	0.	0	213.629	.383449	.317008	-2.15
32	-128.89	12884.	90	0.	0	213.629	.355428	.291080	-2.10
33	-137.78	12108.	92	0.	0	213.629	.326718	.265786	-2.01
34	-146.67	11258.	95	0.	0	213.629	.295908	.241649	-1.83
35	-155.56	11102.	99	0.	0	213.629	.262897	.218733	-1.67
36	-164.44	11037.	100	0.	0	213.629	.229298	.196400	-1.60
37	-173.33	10466.	100	0.	0	213.629	.196685	.174467	-1.45
38	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

30	-191.11	8613.	101	0.	0	213.629	.142692	.133491	-1.12

PROB 5 36-IN. DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.96	50.	65.28	16477.	12	14435.	8
2.79	100.	126.46	16589.	13	13519.	8
3.84	150.	183.89	16861.	22	12554.	8
4.94	200.	237.75	16877.	21	11378.	7
5.86	250.	288.19	16890.	21	10367.	7
6.82	300.	335.47	16903.	21	9387.	7
7.89	350.	379.80	16916.	20	8442.	7
9.11	400.	421.38	16929.	20	7565.	7
12.64	450.	460.37	16943.	20	6751.	6
13.80	500.	496.91	16956.	20	6048.	6
14.99	550.	531.17	16969.	20	5419.	6
16.01	600.	563.27	16982.	20	4769.	6
17.09	650.	593.34	16995.	20	4156.	6
18.24	700.	621.48	17007.	20	2762.	7
19.48	750.	647.80	17020.	20	2129.	7
20.82	800.	672.39	17033.	20	1475.	32
22.26	850.	695.36	17045.	20	980.	32
23.83	900.	716.82	17058.	20	508.	32
25.54	950.	736.82	17070.	20	55.	32
27.39	1000.	755.36	17083.	20	0.	39
29.42	1050.	772.63	17095.	19	0.	39
31.65	1100.	788.68	17108.	19	0.	39
34.10	1150.	803.57	17121.	19	0.	39
36.79	1200.	817.23	17134.	19	0.	39
39.78	1250.	829.83	17147.	19	0.	39
43.13	1300.	841.44	17160.	19	0.	39
46.85	1350.	852.10	17173.	19	0.	39
51.05	1400.	862.11	17186.	19	0.	39
55.82	1450.	871.37	17199.	19	0.	39
61.24	1500.	880.01	17211.	19	0.	39
67.52	1550.	887.86	17224.	19	0.	39
74.74	1600.	895.05	17237.	19	0.	39
83.23	1650.	901.55	17249.	19	0.	39
93.23	1700.	906.83	17262.	19	0.	39
105.18	1750.	911.36	17274.	19	0.	39
119.74	1800.	915.59	17287.	19	0.	39
137.47	1850.	918.63	17299.	19	0.	39
160.13	Tons 1900.	920.33	17312.	19	0.	39
188.70	1800 1950.	920.39	17324.	19	0.	39
227.37	2000.	919.55	17337.	19	0.	39
281.08	2050.	919.97	17349.	19	0.	39
358.70	2100.	927.76	17361.	19	0.	39

PROB 5 36-IN. DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
137.07	1850.
188.70	1950.
227.37	2000.
281.08	2050.

WAVE EQUATION ANALYSIS FOR 36-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

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PROB
  6      36-IN. DIAMETER PILES 3-PILE STRUCTUR
         200FT PENETRATION -- VULCAN 060 HAMMER
         GTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN.     RU = 50
```

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	36.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

```
NUMBER OF SECTIONS CHANGED          0
NUMBER OF SECTIONS ADDED            0
LENGTH OF FREE STANDING PILE(FT)    120.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	2.000	90.	0	90
2	1	2.000	100.	90	190
3	1	2.000	50.	190	240
4	1	2.000	80.	240	320

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES     1
SIDE DAMPENING RESISTANCE   = JSIDE     .15
POINT DAMPENING RESISTANCE  = JPONT     .15
SOIL QUAKE FOR SIDE         = QSIDE     .10
SOIL QUAKE FOR POINT        = QPOINT    .30
```

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PRGM 6 36-IN. DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	57363289.
3	120.00	0.00	6542.38	213.63	1.00	57363289.
4	111.00	0.00	6542.38	213.63	1.00	57363289.
5	102.00	0.00	6542.38	213.63	1.00	57363289.
6	93.00	0.00	6542.38	213.63	1.00	57363289.
7	84.00	0.00	6542.38	213.63	1.00	57363289.
8	75.00	0.00	6542.38	213.63	1.00	57363289.
9	66.00	0.00	6542.38	213.63	1.00	57363289.
10	57.00	0.00	6542.38	213.63	1.00	57363289.
11	48.00	0.00	6542.38	213.63	1.00	57363289.
12	39.00	0.00	6542.38	213.63	1.00	57363289.
13	30.00	0.00	6057.76	213.63	1.00	61952352.
14	21.67	0.00	6057.76	213.63	1.00	61952352.
15	13.33	0.00	6057.76	213.63	1.00	61952352.
16	5.00	0.00	6057.76	213.63	1.00	61952352.
17	-3.33	0.00	6057.76	213.63	1.00	61952352.
18	-11.67	0.00	6057.76	213.63	1.00	61952352.
19	-20.00	0.00	6057.76	213.63	1.00	61952352.
20	-28.33	0.00	6057.76	213.63	1.00	61952352.
21	-36.67	0.00	6057.76	213.63	1.00	61952352.
22	-45.00	0.00	6057.76	213.63	1.00	61952352.
23	-53.33	0.00	6057.76	213.63	1.00	61952352.
24	-61.67	0.00	6057.76	213.63	1.00	61952352.
25	-70.00	0.00	6057.76	213.63	1.00	61952352.
26	-78.33	0.00	6057.76	213.63	1.00	61952352.
27	-86.67	0.00	6057.76	213.63	1.00	61952352.
28	-95.00	0.00	6057.76	213.63	1.00	61952352.
29	-103.33	0.00	6057.76	213.63	1.00	61952352.
30	-111.67	0.00	6057.76	213.63	1.00	61952352.
31	-120.00	0.00	6461.61	213.63	1.00	58080330.
32	-128.89	0.00	6461.61	213.63	1.00	58080330.
33	-137.78	0.00	6461.61	213.63	1.00	58080330.
34	-146.67	0.00	6461.61	213.63	1.00	58080330.
35	-155.56	0.00	6461.61	213.63	1.00	58080330.
36	-164.44	0.00	6461.61	213.63	1.00	58080330.
37	-173.33	0.00	6461.61	213.63	1.00	58080330.
38	-182.22	0.00	6461.61	213.63	1.00	58080330.
39	-191.11	1000.00	6461.61	213.63	1.00	58080330.

PROB 6 36-IN. DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0334 INCHES
NUMBER OF BLOWS PER FOOT = 359.80
TOTAL INTERVALS = 121

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4912798.	19	0.	47	1.000	1.349720	1.349720	-.01
2	0.00	3500166.	26	0.	0	1.000	1.025296	1.009843	-.61
3	120.00	16406.	28	0.	0	213.629	1.006365	.988434	-.70
4	111.00	16422.	30	0.	0	213.629	.997060	.977053	-.79
5	102.00	16447.	33	0.	0	213.629	.986704	.965073	-.86
6	93.00	16484.	35	0.	0	213.629	.975257	.952451	-.93
7	84.00	16514.	37	0.	0	213.629	.962542	.939157	-.98
8	75.00	16526.	39	0.	0	213.629	.948599	.925111	-1.02
9	66.00	16547.	41	0.	0	213.629	.933385	.910335	-1.05
10	57.00	16568.	43	0.	0	213.629	.916806	.894616	-1.05
11	48.00	16615.	46	0.	0	213.629	.899073	.878034	-1.05
12	39.00	16668.	48	0.	0	213.629	.880125	.860461	-1.02
13	30.00	16702.	50	0.	0	213.629	.860262	.841906	-.98
14	21.67	16755.	52	0.	0	213.629	.841469	.823789	-.92
15	13.33	16835.	54	0.	0	213.629	.825001	.804655	-.86
16	5.00	16945.	56	0.	0	213.629	.810251	.784611	-.79
17	-3.33	17051.	58	0.	0	213.629	.795019	.763712	-.71
18	-11.67	17122.	60	0.	0	213.629	.779028	.742068	-.64
19	-20.00	17156.	62	0.	0	213.629	.762152	.720043	-.56
20	-28.33	17154.	64	0.	0	213.629	.744288	.697979	-.45
21	-36.67	17116.	66	0.	0	213.629	.725505	.676295	-.35
22	-45.00	17041.	68	0.	0	213.629	.705905	.655461	-.26
23	-53.33	16933.	71	0.	0	213.629	.685545	.635630	-.21
24	-61.67	16800.	73	0.	0	213.629	.664579	.616603	-.27
25	-70.00	16639.	75	0.	0	213.629	.643160	.598048	-.44
26	-78.33	16440.	77	0.	0	213.629	.621278	.579418	-.67
27	-86.67	16186.	79	0.	0	213.629	.599212	.560477	-.86
28	-95.00	15898.	81	0.	0	213.629	.576898	.541646	-1.02
29	-103.33	15562.	83	0.	0	213.629	.555402	.523216	-1.15
30	-111.67	15194.	85	0.	0	213.629	.537239	.505137	-1.33
31	-120.00	14814.	87	0.	0	213.629	.521252	.486868	-1.59
32	-128.89	14382.	89	0.	0	213.629	.503000	.466589	-1.87
33	-137.78	13811.	91	0.	0	213.629	.482909	.445629	-1.97
34	-146.67	12933.	92	0.	0	213.629	.461973	.424667	-1.88
35	-155.56	11735.	93	0.	0	213.629	.440093	.404220	-1.85
36	-164.44	11352.	99	0.	0	213.629	.415904	.383662	-1.86
37	-173.33	11135.	101	0.	0	213.629	.388827	.362322	-1.76
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2[illegible]3.629	.361023	.340561	-1.55

39	191.11	11414.	106	0.	0	213.629	.333352	.318528	-1.38

PROB 6 36-IN. DIAMETER PILES 3-PILE STRUCTUR
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.77	50.	93.11	16520.	12	14358.	8
2.48	100.	180.12	16607.	13	13383.	8
3.42	150.	261.59	16884.	26	12371.	8
4.63	200.	337.84	16880.	22	11125.	8
6.09	250.	409.12	16888.	22	10101.	7
7.35	300.	475.74	16897.	21	9112.	7
8.71	350.	538.11	16906.	21	8121.	7
10.32	400.	596.62	16915.	21	7233.	7
14.77	450.	651.47	16924.	21	6364.	7
16.47	500.	702.95	16933.	21	5526.	7
18.35	550.	751.24	16943.	20	4741.	7
19.95	600.	796.49	16953.	20	4008.	7
21.67	650.	838.90	16963.	20	3293.	7
23.55	700.	878.56	16973.	20	1891.	4
25.62	750.	915.39	16982.	20	1551.	4
27.94	800.	949.87	16992.	20	403.	31
30.51	850.	981.51	17002.	20	0.	39
33.41	900.	1010.82	17012.	20	0.	39
36.69	950.	1037.91	17022.	20	0.	39
40.41	1000.	1062.58	17031.	20	0.	39
44.69	1050.	1085.29	17041.	20	0.	39
49.62	1100.	1111.97	17051.	20	0.	39
55.40	1150.	1143.59	17060.	20	0.	39
62.20	1200.	1158.96	17070.	20	0.	39
70.32	1250.	1188.50	17080.	20	0.	39
80.23	1300.	1198.47	17089.	20	0.	39
92.48	1350.	1220.26	17098.	20	0.	39
107.94	1400.	1223.89	17108.	20	0.	39
128.34	1450.	1241.47	17117.	20	0.	39
155.62	1500.	1231.61	17126.	20	0.	39
195.14	159 1550.	1237.69	17136.	19	0.	39
255.28	1600.	1233.06	17146.	19	0.	39
359.80	1650.	1219.22	17156.	19	0.	39

```
PROB          6     36-IN. DIAMETER PILES 3-PILE STRUCTUR
      200FT PENETRATION -- VULCAN 060 HAMMER

      QTIP=.30 ,MINIMUM WALL THICKNESS=2.0 IN.     RU = 50

    TABLE 10 -- SPECIFIED BLOW DATA

      TIP RESISTANCE PERCENTAGE =      50.00

           BLOWS PER          RESISTANCE
             FOOT                TONS

            128.34               1450.
            195.14               1550.
            255.28               1600.
            291.95               1621.
```

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	- 1.75 in. (Uniform)
Penetration	- 250 ft.
	- 200 ft.
Hammer	- Vulcan 060
Quake Factor, tip	- .025 in.
	- .10 in.
	- .30 in.

4

6000 REMOTE BATCH

UNITED COMPUTING 67, APEX/SL 8.2.0

07.26.08.   05/26/76.

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JJJJJJJJJJJ  YY         YY  JJJJJJJJJJJ       111      CCCCCCCCCC  EEEEEEEEEEEE  YY         YY
JJJJJJJJJJJ  YY         YY  JJJJJJJJJJJ      1111     CCCCCCCCCCCC EEEEEEEEEEEE  YY         YY
         JJ  YY         YY           JJ     11 11     CC        CC EE            YY         YY
         JJ  YY         YY           JJ        11     CC           EE            YY         YY
         JJ  YY         YY           JJ        11     CC           EE            YY         YY
         JJ  YY         YY           JJ        11     CC           EE            YY         YY
         JJ  YYY       YYY           JJ        11     CC           EE            YYY       YYY
         JJ   YYY     YYY            JJ        11     CC           EEEEEEEE       YYY     YYY
         JJ    YYY   YYY             JJ        11     CC           EEEEEEEE        YYY   YYY
         JJ      YYYY                JJ        11     CC           EE                YYYY
         JJ       YY                 JJ        11     CC           EE                 YY
         JJ       YY                 JJ        11     CC           EE                 YY
         JJ       YY                 JJ        11     CC           EE                 YY
JJ       JJ       YY        JJ       JJ        11     CC        CC EE                 YY
 JJJJJJJ          YY         JJJJJJJ     1111111111111 CCCCCCCCCCCC EEEEEEEEEEEE       YY
  JJJJJ           YY          JJJJJ      1111111111111  CCCCCCCCCC  EEEEEEEEEEEE       YY
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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB
1 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER
QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 120.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	90.	0	90
2	1	1.750	100.	90	190
3	1	1.750	100.	190	290
4	1	1.750	80.	290	370

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .02

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

DTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	59419510.
3	120.00	0.00	6776.90	221.29	1.00	59419510.
4	111.00	0.00	6776.90	221.29	1.00	59419510.
5	102.00	0.00	6776.90	221.29	1.00	59419510.
6	93.00	0.00	6776.90	221.29	1.00	59419510.
7	84.00	0.00	6776.90	221.29	1.00	59419510.
8	75.00	0.00	6776.90	221.29	1.00	59419510.
9	66.00	0.00	6776.90	221.29	1.00	59419510.
10	57.00	0.00	6776.90	221.29	1.00	59419510.
11	48.00	0.00	6776.90	221.29	1.00	59419510.
12	39.00	0.00	6776.90	221.29	1.00	59419510.
13	30.00	0.00	6274.91	221.29	1.00	64173070.
14	21.67	0.00	6274.91	221.29	1.00	64173070.
15	13.33	0.00	6274.91	221.29	1.00	64173070.
16	5.00	0.00	6274.91	221.29	1.00	64173070.
17	-3.33	0.00	6274.91	221.29	1.00	64173070.
18	-11.67	0.00	6274.91	221.29	1.00	64173070.
19	-20.00	0.00	6274.91	221.29	1.00	64173070.
20	-28.33	0.00	6274.91	221.29	1.00	64173070.
21	-36.67	0.00	6274.91	221.29	1.00	64173070.
22	-45.00	0.00	6274.91	221.29	1.00	64173070.
23	-53.33	0.00	6274.91	221.29	1.00	64173070.
24	-61.67	0.00	6274.91	221.29	1.00	64173070.
25	-70.00	0.00	6274.91	221.29	1.00	64173070.
26	-78.33	0.00	6274.91	221.29	1.00	64173070.
27	-86.67	0.00	6274.91	221.29	1.00	64173070.
28	-95.00	0.00	6274.91	221.29	1.00	64173070.
29	-103.33	0.00	6274.91	221.29	1.00	64173070.
30	-111.67	0.00	6274.91	221.29	1.00	64173070.
31	-120.00	0.00	6274.91	221.29	1.00	64173070.
32	-128.33	0.00	6274.91	221.29	1.00	64173070.
33	-136.67	0.00	6274.91	221.29	1.00	64173070.
34	-145.00	0.00	6274.91	221.29	1.00	64173070.
35	-153.33	0.00	6274.91	221.29	1.00	64173070.
36	-161.67	0.00	6274.91	221.29	1.00	64173070.
37	-170.00	0.00	6693.23	221.29	1.00	60162254.
38	-178.89	0.00	6693.23	221.29	1.00	60162254.
39	-187.78	0.00	6693.23	221.29	1.00	60162254.
40	-196.67	0.00	6693.23	221.29	1.00	60162254.
41	-205.56	0.00	6693.23	221.29	1.00	60162254.
42	-214.44	0.00	6693.23	221.29	1.00	60162254.
43	-223.33	0.00	6693.23	221.29	1.00	60162254.
44	-232.22	0.00	6693.23	221.29	1.00	60162254.
45	-241.11	1000.00	6693.23	221.29	1.00	60162254.

PROB 1 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

DTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE A -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0421 INCHES
NUMBER OF BLOWS PER FOOT = 285.17
TOTAL INTERVALS = 122

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	[illegible]	[illegible]	19	0.	27	[illegible]	1.297194	1.293102	-.65
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	.975513	[illegible]	-1.18
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	.955551	.913169	-1.28
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	.941276	[illegible]	-1.38
[illegible]	[illegible]	[illegible]	33	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	-1.47
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	-1.56
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	.831533	[illegible]	-1.72
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	52	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	1	221.24[illegible]	[illegible]	[illegible]	[illegible]

3	-187.78	8016.	103	0.	0	221.286	.175021	.131142	-1.68
0	-196.67	7467.	108	0.	0	221.286	.150148	.114495	-1.51
41	-205.56	7036.	109	0.	0	221.286	.125854	.100804	-1.31
42	-214.44	6160.	109	0.	0	221.286	.104312	.089424	-1.11
43	-223.33	5527.	111	0.	0	221.286	.086061	.079873	-1.02
44	-232.22	4639.	112	0.	0	221.286	.073460	.071075	-.84
45	-241.11	3620.	115	0.	0	221.286	.062080	.061318	-.50

PROB 1 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.27	50.	26.03	16230.	7	14464.	22
3.00	100.	50.61	16322.	15	13682.	8
3.84	150.	73.82	16501.	22	12908.	8
4.67	200.	95.73	16618.	22	11998.	8
5.52	250.	116.38	16636.	21	11055.	8
6.34	300.	135.82	16647.	21	10276.	7
7.21	350.	154.14	16657.	21	9501.	7
8.19	400.	171.40	16666.	21	8739.	7
9.23	450.	187.66	16676.	20	8028.	7
10.39	500.	202.96	16687.	20	7337.	7
13.53	550.	217.35	16698.	20	6664.	7
14.31	600.	230.88	16708.	20	6101.	6
15.13	650.	243.58	16719.	20	5560.	38
16.01	700.	255.50	16729.	20	5085.	38
16.94	750.	266.67	16739.	20	4630.	38
17.93	800.	277.14	16750.	20	4190.	38
18.99	850.	286.92	16760.	20	3764.	38
20.11	900.	296.08	16770.	20	3369.	39
21.32	950.	304.63	16780.	20	3002.	39
22.61	1000.	312.58	16790.	20	2648.	39
24.00	1050.	319.98	16800.	20	2305.	39
25.50	1100.	326.85	16810.	20	1972.	39
27.10	1150.	333.24	16820.	20	1649.	39
28.84	1200.	339.14	16830.	20	1337.	39
30.73	1250.	344.57	16840.	20	1032.	39
32.77	1300.	349.56	16850.	20	729.	39
35.02	1350.	354.13	16860.	20	429.	39
37.45	1400.	358.29	16870.	19	177.	40
40.15	1450.	361.99	16881.	19	0.	45
43.08	1500.	365.29	16891.	19	0.	45
46.35	1550.	368.16	16901.	19	0.	45
49.92	1600.	370.52	16911.	19	0.	45
53.94	1650.	372.42	16922.	19	0.	45
58.37	1700.	373.78	16932.	19	0.	45
63.57	1750.	374.66	16942.	19	0.	45
69.01	1800.	375.10	16952.	19	0.	45
75.33	1850.	375.27	16963.	19	0.	45
82.61	1900.	375.55	16973.	19	0.	45
90.90	1950.	375.93	16983.	19	0.	45
100.33	2000.	377.34	16993.	19	0.	45
111.38	2050.	379.22	17003.	19	0.	45
123.87	2100.	381.44	17013.	19	0.	45
138.38	2150.	383.84	17023.	19	0.	45

172.44	2250.	389.16	17043.	19	0.	45
194.00	2300.	391.97	17053.	19	0.	45
218.35	2350.	394.79	17063.	19	0.	45
247.94	2400.	397.68	17073.	19	0.	45
285.17	2450.	400.58	17083.	19	0.	45
331.08	2500.	403.58	17092.	19	0.	45

2500

PROB 1 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.75IN.   RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
138.38	2150.
194.00	2500.
247.94	2400.
285.17	2450.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB
2 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER
QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU # 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 120.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	90.	0	90
2	1	1.750	100.	90	190
3	1	1.750	100.	190	290
4	1	1.750	80.	290	370

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	59419510.
3	120.00	0.00	6776.90	221.29	1.00	59419510.
4	111.00	0.00	6776.90	221.29	1.00	59419510.
5	102.00	0.00	6776.90	221.29	1.00	59419510.
6	93.00	0.00	6776.90	221.29	1.00	59419510.
7	84.00	0.00	6776.90	221.29	1.00	59419510.
8	75.00	0.00	6776.90	221.29	1.00	59419510.
9	66.00	0.00	6776.90	221.29	1.00	59419510.
10	57.00	0.00	6776.90	221.29	1.00	59419510.
11	48.00	0.00	6776.90	221.29	1.00	59419510.
12	39.00	0.00	6776.90	221.29	1.00	59419510.
13	30.00	0.00	6274.91	221.29	1.00	64173070.
14	21.67	0.00	6274.91	221.29	1.00	64173070.
15	13.33	0.00	6274.91	221.29	1.00	64173070.
16	5.00	0.00	6274.91	221.29	1.00	64173070.
17	-3.33	0.00	6274.91	221.29	1.00	64173070.
18	-11.67	0.00	6274.91	221.29	1.00	64173070.
19	-20.00	0.00	6274.91	221.29	1.00	64173070.
20	-28.33	0.00	6274.91	221.29	1.00	64173070.
21	-36.67	0.00	6274.91	221.29	1.00	64173070.
22	-45.00	0.00	6274.91	221.29	1.00	64173070.
23	-53.33	0.00	6274.91	221.29	1.00	64173070.
24	-61.67	0.00	6274.91	221.29	1.00	64173070.
25	-70.00	0.00	6274.91	221.29	1.00	64173070.
26	-78.33	0.00	6274.91	221.29	1.00	64173070.
27	-86.67	0.00	6274.91	221.29	1.00	64173070.
28	-95.00	0.00	6274.91	221.29	1.00	64173070.
29	-103.33	0.00	6274.91	221.29	1.00	64173070.
30	-111.67	0.00	6274.91	221.29	1.00	64173070.
31	-120.00	0.00	6274.91	221.29	1.00	64173070.
32	-128.33	0.00	6274.91	221.29	1.00	64173070.
33	-136.67	0.00	6274.91	221.29	1.00	64173070.
34	-145.00	0.00	6274.91	221.29	1.00	64173070.
35	-153.33	0.00	6274.91	221.29	1.00	64173070.
36	-161.67	0.00	6274.91	221.29	1.00	64173070.
37	-170.00	0.00	6693.23	221.29	1.00	60162254.
38	-178.89	0.00	6693.23	221.29	1.00	60162254.
39	-187.78	0.00	6693.23	221.29	1.00	60162254.
40	-196.67	0.00	6693.23	221.29	1.00	60162254.
41	-205.56	0.00	6693.23	221.29	1.00	60162254.
42	-214.44	0.00	6693.23	221.29	1.00	60162254.
43	-223.33	0.00	6693.23	221.29	1.00	60162254.
44	-232.22	0.00	6693.23	221.29	1.00	60162254.
45	-241.11	1000.00	6693.23	221.29	1.00	60162254.

PROB 2 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0401 INCHES
NUMBER OF BLOWS PER FOOT = 299.22
TOTAL INTERVALS = 124

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4927002.	19	0.	47	1.000	1.321285	1.320111	-.23
2	0.00	3572030.	26	0.	0	1.000	.996728	.972744	-.75
3	120.00	16164.	28	0.	0	221.286	.978296	.951116	-.84
4	111.00	16181.	30	0.	0	221.286	.969376	.939420	-.92
5	102.00	16202.	33	0.	0	221.286	.959409	.927181	-1.00
6	93.00	16240.	35	0.	0	221.286	.948339	.914362	-1.08
7	84.00	16270.	37	0.	0	221.286	.936025	.900921	-1.14
8	75.00	16283.	39	0.	0	221.286	.922534	.886852	-1.20
9	66.00	16305.	41	0.	0	221.286	.907772	.872032	-1.24
10	57.00	16328.	43	0.	0	221.286	.891772	.856525	-1.27
11	48.00	16371.	46	0.	0	221.286	.874673	.840118	-1.28
12	39.00	16424.	48	0.	0	221.286	.856445	.822886	-1.29
13	30.00	16458.	50	0.	0	221.286	.837534	.804708	-1.28
14	21.67	16511.	52	0.	0	221.286	.820516	.787047	-1.25
15	13.33	16591.	54	0.	0	221.286	.806495	.768516	-1.21
16	5.00	16700.	56	0.	0	221.286	.792621	.749044	-1.14
17	-3.33	16807.	58	0.	0	221.286	.778054	.728717	-1.08
18	-11.67	16878.	60	0.	0	221.286	.762694	.707585	-1.01
19	-20.00	16912.	62	0.	0	221.286	.746295	.685689	-.94
20	-28.33	16911.	64	0.	0	221.286	.728922	.663255	-.90
21	-36.67	16874.	66	0.	0	221.286	.710582	.640386	-.86
22	-45.00	16800.	68	0.	0	221.286	.691354	.617245	-.84
23	-53.33	16691.	71	0.	0	221.286	.671311	.594156	-.85
24	-61.67	16555.	73	0.	0	221.286	.650520	.571227	-.88
25	-70.00	16385.	75	0.	0	221.286	.629018	.548472	-.92
26	-78.33	16182.	77	0.	0	221.286	.606826	.526089	-.98
27	-86.67	15944.	79	0.	0	221.286	.584102	.504178	-1.04
28	-95.00	15673.	81	0.	0	221.286	.560808	.482713	-1.10
29	-103.33	15374.	83	0.	0	221.286	.537092	.461796	-1.17
30	-111.67	15048.	85	0.	0	221.286	.513247	.441556	-1.22
31	-120.00	14697.	87	0.	0	221.286	.489181	.422009	-1.26
32	-128.33	14310.	89	0.	0	221.286	.465121	.403084	-1.32
33	-136.67	13877.	91	0.	0	221.286	.441290	.384801	-1.44
34	-145.00	13420.	93	0.	0	221.286	.417701	.366817	-1.62
35	-153.33	12938.	95	0.	0	221.286	.394405	.348550	-1.81
36	-161.67	12393.	98	0.	0	221.286	.371719	.329624	-2.01
37	-170.00	11871.	100	0.	0	221.286	.349785	.310105	-2.14
38	-178.89	11306.	102	0.	0	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	-187.78	10692.	102	0.	0	221.286	.304102	.267435	-2.08
[illegible]	-196.67	10020.	104	0.	0	221.286	.278505	.245716	-1.95
41	-205.56	9870.	111	0.	0	221.286	.250149	.223938	-1.71
42	-214.44	10004.	113	0.	0	221.286	.220398	.202970	-1.42
43	-223.33	9858.	111	0.	0	221.286	.190915	.182668	-1.18
44	-232.22	9538.	114	0.	0	221.286	.164622	.161393	-.86
45	-241.11	8477.	115	0.	0	221.286	.140105	.139765	-.49

PROB 2 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.92	50.	64.94	16273.	12	14359.	19
2.83	100.	125.97	16363.	15	13501.	8
3.82	150.	183.39	16558.	24	12670.	8
4.75	200.	237.39	16635.	23	11648.	8
5.70	250.	288.12	16640.	22	10610.	8
6.63	300.	335.77	16646.	22	9691.	7
7.63	350.	380.56	16652.	22	8841.	7
8.76	400.	422.66	16658.	21	8030.	7
10.00	450.	462.25	16665.	21	7247.	7
13.57	500.	499.44	16672.	21	6507.	7
14.73	550.	534.38	16679.	21	5825.	6
15.70	600.	567.19	16686.	21	5229.	6
16.73	650.	597.99	16693.	21	4204.	8
17.83	700.	626.88	16700.	20	3444.	37
19.01	750.	653.96	16708.	20	2913.	37
20.28	800.	679.31	16716.	20	2400.	37
21.65	850.	703.03	16724.	20	1916.	38
23.13	900.	725.22	16732.	20	1471.	38
24.74	950.	745.95	16739.	20	1046.	38
26.49	1000.	765.28	16747.	20	637.	38
28.39	1050.	783.21	16755.	20	234.	38
30.47	1100.	799.92	16762.	20	0.	45
32.75	1150.	815.45	16770.	20	0.	45
35.26	1200.	829.84	16778.	20	0.	45
38.01	1250.	843.04	16785.	20	0.	45
41.09	1300.	855.21	16793.	20	0.	45
44.53	1350.	866.40	16801.	20	0.	45
48.36	1400.	876.69	16808.	20	0.	45
52.70	1450.	886.10	16816.	20	0.	45
57.43	1500.	894.67	16823.	20	0.	45
63.24	1550.	902.61	16831.	20	0.	45
69.74	1600.	910.04	16838.	20	0.	45
77.23	1650.	916.77	16846.	20	0.	45
86.10	1700.	922.78	16853.	20	0.	45
96.47	1750.	928.17	16860.	20	0.	45
109.17	1800.	933.06	16868.	20	0.	45
124.24	1850.	936.89	16875.	20	0.	45
143.19	1900.	939.56	16882.	20	0.	45
167.15	1950.	940.89	16890.	20	0.	45
197.95	2000.	940.53	16897.	19	0.	45
240.45	2050.	939.43	16905.	19	0.	45
299.22	2100.	937.97	16912.	19	0.	45
387.45	2150.	947.23	16920.	19	0.	45

2129

PROB 2 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
143.19	1900.
197.95	2000.
240.45	2050.
299.22	2100.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

 PROB
   3       42-IN. DIAMETER PILES 3-PILE STRUCTURE
           250FT PENETRATION -- VULCAN 060 HAMMER
           QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN.      RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                               1
     NEW HAMMER DATA OPTION                  1
     NEW MATERIAL DATA OPTION                1
     NEW PILE SECTION DATA OPTION            1
     NEW SOIL DATA OPTION                    1
     SPECIFIED BLOW COUNT OPTION             1
     OUTPUT OPTION FOR STRESS                1
     BPF FOR STRESS OUTPUT OPTION                          275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                  50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)             300.
     SPECIFIED SEGMENT LENGTH (FT)                         -0.00


TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION             VULCAN 060 HAMMER
     HAMMER EFFICIENCY                     .75
     HAMMER ENERGY (FT-LBS)          300000.00
     HAMMER EXPLOSIVE FORCE (LBS)        -0.00
     NUMBER OF HAMMER SEGMENTS               2

     SEGMENT     SLACK      WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER     (IN)        (LB)     (SQ IN) RESTITUTION     (LB / IN)

        1       1000.00  60000.00      1.00       .60         9200000.00
        2       1000.00  42000.00      1.00       .90               0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =    1

       MATERIAL       (TOD)   UNIT WT.   MODULUS
         TYPE                  (PCF)      (PSI)

          1          42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 120.00

ID	TER. TYP.	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
	1	1.750	90.	0	90
	1	1.750	100.	90	190
	1	1.750	100.	190	290
	1	1.750	80.	290	370

SO DATA

TIP RESISTANCE PERCENTAGES 1
[illegible] RESISTANCE = JSIDE .15
[illegible] PENING RESISTANCE = JPONT .15
SOIL [illegible] AKE FOR SIDE = QSIDE .10
SOIL [illegible] AKE FOR POINT = QPOINT .30

[illegible]STANCE
PERCENTAGE

000[illegible]

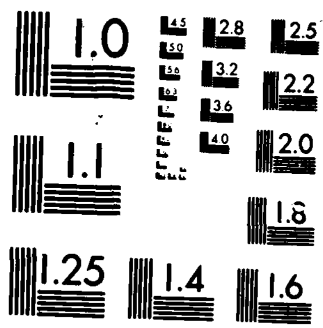
A SPECIFIED BLOW COUNT DATA

[illegible]ER SPECIFIED BLOW COUNTS 4

[illegible]WS PER FO[illegible]	TOLERANCE
	25.
[illegible]	25.
250.	25.
300.	25.

AD-A163 522 FOUNDATION ANALYSIS EAST COAST AIR COMBAT MANEUVERING RANGE OFFSHORE KITT..(U) CREST ENGINEERING INC TULSA OK SEP 76 27-771-97 CHES/NAVFAC-FPO-7612 N62477-76-C-0179 4/6

UNCLASSIFIED F/G 13/13 NL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1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0

PROB 3 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	59419510.
3	120.00	0.00	6776.90	221.29	1.00	59419510.
4	111.00	0.00	6776.90	221.29	1.00	59419510.
5	102.00	0.00	6776.90	221.29	1.00	59419510.
6	93.00	0.00	6776.90	221.29	1.00	59419510.
7	84.00	0.00	6776.90	221.29	1.00	59419510.
8	75.00	0.00	6776.90	221.29	1.00	59419510.
9	66.00	0.00	6776.90	221.29	1.00	59419510.
10	57.00	0.00	6776.90	221.29	1.00	59419510.
11	48.00	0.00	6776.90	221.29	1.00	59419510.
12	39.00	0.00	6776.90	221.29	1.00	59419510.
13	30.00	0.00	6274.91	221.29	1.00	64173070.
14	21.67	0.00	6274.91	221.29	1.00	64173070.
15	13.33	0.00	6274.91	221.29	1.00	64173070.
16	5.00	0.00	6274.91	221.29	1.00	64173070.
17	-3.33	0.00	6274.91	221.29	1.00	64173070.
18	-11.67	0.00	6274.91	221.29	1.00	64173070.
19	-20.00	0.00	6274.91	221.29	1.00	64173070.
20	-28.33	0.00	6274.91	221.29	1.00	64173070.
21	-36.67	0.00	6274.91	221.29	1.00	64173070.
22	-45.00	0.00	6274.91	221.29	1.00	64173070.
23	-53.33	0.00	6274.91	221.29	1.00	64173070.
24	-61.67	0.00	6274.91	221.29	1.00	64173070.
25	-70.00	0.00	6274.91	221.29	1.00	64173070.
26	-78.33	0.00	6274.91	221.29	1.00	64173070.
27	-86.67	0.00	6274.91	221.29	1.00	64173070.
28	-95.00	0.00	6274.91	221.29	1.00	64173070.
29	-103.33	0.00	6274.91	221.29	1.00	64173070.
30	-111.67	0.00	6274.91	221.29	1.00	64173070.
31	-120.00	0.00	6274.91	221.29	1.00	64173070.
32	-128.33	0.00	6274.91	221.29	1.00	64173070.
33	-136.67	0.00	6274.91	221.29	1.00	64173070.
34	-145.00	0.00	6274.91	221.29	1.00	64173070.
35	-153.33	0.00	6274.91	221.29	1.00	64173070.
36	-161.67	0.00	6274.91	221.29	1.00	64173070.
37	-170.00	0.00	6693.23	221.29	1.00	60162254.
38	-178.89	0.00	6693.23	221.29	1.00	60162254.
39	-187.78	0.00	6693.23	221.29	1.00	60162254.
40	-196.67	0.00	6693.23	221.29	1.00	60162254.
41	-205.56	0.00	6693.23	221.29	1.00	60162254.
42	-214.44	0.00	6693.23	221.29	1.00	60162254.
43	-223.33	0.00	6693.23	221.29	1.00	60162254.
44	-232.22	0.00	6693.23	221.29	1.00	60162254.
45	-241.11	1000.00	6693.23	221.29	1.00	60162254.

PROB 3 42-IN, DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0320 INCHES
NUMBER OF BLOWS PER FOOT = 375.00
TOTAL INTERVALS = 127

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4927002.	19	0.	47	1.000	1.354983	1.354803	-.10
2	0.00	3572030.	26	0.	0	1.000	1.026216	1.013236	-.41
3	120.00	16164.	28	0.	0	221.286	1.009275	.993640	-.48
4	111.00	16181.	30	0.	0	221.286	1.002394	.984461	-.55
5	102.00	16202.	33	0.	0	221.286	.994744	.974908	-.61
6	93.00	16240.	35	0.	0	221.286	.986251	.964980	-.68
7	84.00	16270.	37	0.	0	221.286	.976866	.954661	-.74
8	75.00	16283.	39	0.	0	221.286	.966566	.943873	-.79
9	66.00	16305.	41	0.	0	221.286	.955236	.932627	-.84
10	57.00	16328.	43	0.	0	221.286	.942919	.920762	-.88
11	48.00	16370.	46	0.	0	221.286	.929523	.908336	-.91
12	39.00	16423.	48	0.	0	221.286	.915074	.895152	-.92
13	30.00	16454.	50	0.	0	221.286	.899635	.881222	-.92
14	21.67	16496.	52	0.	0	221.286	.884434	.867594	-.90
15	13.33	16555.	54	0.	0	221.286	.868373	.853194	-.87
16	5.00	16632.	56	0.	0	221.286	.851513	.837987	-.83
17	-3.33	16707.	58	0.	0	221.286	.833981	.821850	-.76
18	-11.67	16760.	60	0.	0	221.286	.816060	.804814	-.70
19	-20.00	16790.	62	0.	0	221.286	.801670	.786962	-.63
20	-28.33	16799.	64	0.	0	221.286	.787555	.768301	-.56
21	-36.67	16784.	66	0.	0	221.286	.773109	.749054	-.51
22	-45.00	16748.	68	0.	0	221.286	.758153	.729396	-.47
23	-53.33	16689.	70	0.	0	221.286	.742574	.709394	-.44
24	-61.67	16608.	72	0.	0	221.286	.726380	.689315	-.46
25	-70.00	16506.	74	0.	0	221.286	.709580	.669380	-.49
26	-78.33	16381.	76	0.	0	221.286	.692215	.649680	-.52
27	-86.67	16236.	78	0.	0	221.286	.674378	.630430	-.57
28	-95.00	16069.	80	0.	0	221.286	.656163	.611851	-.59
29	-103.33	15887.	83	0.	0	221.286	.637589	.594121	-.57
30	-111.67	15689.	85	0.	0	221.286	.618769	.577540	-.53
31	-120.00	15477.	87	0.	0	221.286	.599711	.562402	-.47
32	-128.33	15242.	89	0.	0	221.286	.580551	.548728	-.43
33	-136.67	14969.	91	0.	0	221.286	.561283	.536167	-.46
34	-145.00	14680.	93	0.	0	221.286	.542194	.524231	-.60
35	-153.33	14366.	95	0.	0	221.286	.523956	.512337	-.81
36	-161.67	14017.	97	0.	0	221.286	.509550	.500044	-.96
37	-170.00	13478.	99	0.	0	221.286	.497511	.487222	-1.03

39	-187.78	12819.	102	0.	0	221.286	[illegible]	[illegible]	[illegible]
40	196.67	12081.	104	0.	0	221.286	.449662	.442228	-1.24
41	-205.56	11032.	105	0.	0	221.286	.431000	.423269	-1.32
42	-214.44	10563.	111	0.	0	221.286	.409811	.402137	-1.17
43	-223.33	10624.	112	0.	0	221.286	.385030	.380029	-.91
44	-232.22	10764.	117	0.	0	221.286	.358688	.357033	-.70
45	-241.11	11269.	118	0.	0	221.286	.332000	.331760	-.40

PROB 3 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.65	50.	92.62	16309.	13	14283.	11
2.38	100.	179.42	16392.	15	13366.	8
3.48	150.	260.85	16581.	32	12476.	8
4.81	200.	337.24	16652.	25	11383.	8
5.96	250.	408.97	16651.	24	10355.	8
7.09	300.	476.16	16652.	23	9383.	8
8.38	350.	539.15	16654.	23	8460.	8
9.88	400.	598.28	16657.	22	7568.	7
11.58	450.	653.92	16661.	22	6746.	7
16.00	500.	706.19	16665.	22	5988.	7
17.79	550.	755.40	16669.	22	5232.	7
19.33	600.	801.66	16674.	21	4525.	7
20.95	650.	845.10	16679.	21	3398.	10
22.72	700.	885.89	16685.	21	2400.	37
24.66	750.	924.08	16690.	21	1835.	37
26.81	800.	959.61	16695.	21	1280.	37
29.21	850.	992.91	16700.	21	753.	37
31.87	900.	1023.46	16705.	21	232.	37
34.87	950.	1051.80	16710.	21	0.	45
38.26	1000.	1078.01	16716.	20	0.	45
42.10	1050.	1101.91	16722.	20	0.	45
46.53	1100.	1123.92	16728.	20	0.	45
51.62	1150.	1149.51	16734.	20	0.	45
57.57	1200.	1180.74	16740.	20	0.	45
64.57	1250.	1196.78	16746.	20	0.	45
73.00	1300.	1226.09	16752.	20	0.	45
83.20	1350.	1234.45	16758.	20	0.	45
95.85	1400.	1257.28	16764.	20	0.	45
111.94	1450.	1260.00	16769.	20	0.	45
132.97	1500.	1276.34	16775.	20	0.	45
161.54	1550.	1266.03	16781.	20	0.	45
202.43	1600.	1269.17	16787.	20	0.	45
265.77	1650.	1261.23	16793.	20	0.	45
375.00	1700.	1246.88	16799.	20	0.	45

1675.

PROB 3 42-IN. DIAMETER PILES 3-PILE STRUCTURE
250FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
132.97	1500.
202.43	1600.
265.77	1650.
293.38	1666.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB
4 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER
QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1	
NEW HAMMER DATA OPTION	1	
NEW MATERIAL DATA OPTION	1	
NEW PILE SECTION DATA OPTION	1	
NEW SOIL DATA OPTION	1	
SPECIFIED BLOW COUNT OPTION	1	
OUTPUT OPTION FOR STRESS	1	
BPF FOR STRESS OUTPUT OPTION		275.
ULTIMATE RESISTANCE INCREMENT (TONS)		50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)		300.
SPECIFIED SEGMENT LENGTH (FT)		-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0
LENGTH OF FREE STANDING PILE(FT)	120.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.750	90.	0	90
2	1	1.750	100.	90	190
3	1	1.750	50.	190	240
4	1	1.750	80.	240	320

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES	1
SIDE DAMPENING RESISTANCE = JSIDE	.15
POINT DAMPENING RESISTANCE = JPONT	.15
SOIL QUAKE FOR SIDE = QSIDE	.10
SOIL QUAKE FOR POINT = QPOINT	.02

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	59419510.
3	120.00	0.00	6776.90	221.29	1.00	59419510.
4	111.00	0.00	6776.90	221.29	1.00	59419510.
5	102.00	0.00	6776.90	221.29	1.00	59419510.
6	93.00	0.00	6776.90	221.29	1.00	59419510.
7	84.00	0.00	6776.90	221.29	1.00	59419510.
8	75.00	0.00	6776.90	221.29	1.00	59419510.
9	66.00	0.00	6776.90	221.29	1.00	59419510.
10	57.00	0.00	6776.90	221.29	1.00	59419510.
11	48.00	0.00	6776.90	221.29	1.00	59419510.
12	39.00	0.00	6776.90	221.29	1.00	59419510.
13	30.00	0.00	6274.91	221.29	1.00	64173070.
14	21.67	0.00	6274.91	221.29	1.00	64173070.
15	13.33	0.00	6274.91	221.29	1.00	64173070.
16	5.00	0.00	6274.91	221.29	1.00	64173070.
17	-3.33	0.00	6274.91	221.29	1.00	64173070.
18	-11.67	0.00	6274.91	221.29	1.00	64173070.
19	-20.00	0.00	6274.91	221.29	1.00	64173070.
20	-28.33	0.00	6274.91	221.29	1.00	64173070.
21	-36.67	0.00	6274.91	221.29	1.00	64173070.
22	-45.00	0.00	6274.91	221.29	1.00	64173070.
23	-53.33	0.00	6274.91	221.29	1.00	64173070.
24	-61.67	0.00	6274.91	221.29	1.00	64173070.
25	-70.00	0.00	6274.91	221.29	1.00	64173070.
26	-78.33	0.00	6274.91	221.29	1.00	64173070.
27	-86.67	0.00	6274.91	221.29	1.00	64173070.
28	-95.00	0.00	6274.91	221.29	1.00	64173070.
29	-103.33	0.00	6274.91	221.29	1.00	64173070.
30	-111.67	0.00	6274.91	221.29	1.00	64173070.
31	-120.00	0.00	6693.23	221.29	1.00	60162254.
32	-128.89	0.00	6693.23	221.29	1.00	60162254.
33	-137.78	0.00	6693.23	221.29	1.00	60162254.
34	-146.67	0.00	6693.23	221.29	1.00	60162254.
35	-155.56	0.00	6693.23	221.29	1.00	60162254.
36	-164.44	0.00	6693.23	221.29	1.00	60162254.
37	-173.33	0.00	6693.23	221.29	1.00	60162254.
38	-182.22	0.00	6693.23	221.29	1.00	60162254.
39	-191.11	1000.00	6693.23	221.29	1.00	60162254.

PROB 4 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0431 INCHES
NUMBER OF BLOWS PER FOOT = 278.28
TOTAL INTERVALS = 110

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4927002.	19	0.	47	1.000	1.273638	1.273610	-.06
2	0.00	3572030.	26	0.	0	1.000	.954110	.937073	-1.05
3	120.00	16164.	28	0.	0	221.286	.931116	.911494	-1.15
4	111.00	16181.	30	0.	0	221.286	.916824	.894663	-1.24
5	102.00	16202.	33	0.	0	221.286	.900971	.876438	-1.33
6	93.00	16240.	35	0.	0	221.286	.883761	.856748	-1.39
7	84.00	16270.	37	0.	0	221.286	.865350	.835626	-1.46
8	75.00	16283.	39	0.	0	221.286	.846407	.813055	-1.50
9	66.00	16305.	41	0.	0	221.286	.828450	.789001	-1.53
10	57.00	16328.	43	0.	0	221.286	.812919	.763592	-1.55
11	48.00	16371.	46	0.	0	221.286	.798491	.736820	-1.55
12	39.00	16427.	48	0.	0	221.286	.783622	.708954	-1.55
13	30.00	16475.	50	0.	0	221.286	.767471	.680091	-1.55
14	21.67	16569.	52	0.	0	221.286	.751029	.652804	-1.56
15	13.33	16731.	54	0.	0	221.286	.732663	.625131	-1.57
16	5.00	16967.	56	0.	0	221.286	.712163	.597230	-1.59
17	-3.33	17193.	58	0.	0	221.286	.689648	.569475	-1.62
18	-11.67	17340.	61	0.	0	221.286	.665006	.541954	-1.62
19	-20.00	17397.	63	0.	0	221.286	.638394	.514640	-1.64
20	-28.33	17361.	65	0.	0	221.286	.610029	.487581	-1.67
21	-36.67	17234.	67	0.	0	221.286	.580119	.460703	-1.67
22	-45.00	17013.	69	0.	0	221.286	.548908	.433965	-1.68
23	-53.33	16710.	71	0.	0	221.286	.516712	.407426	-1.71
24	-61.67	16327.	73	0.	0	221.286	.483910	.380999	-1.72
25	-70.00	15862.	75	0.	0	221.286	.450760	.354691	-1.73
26	-78.33	15320.	78	0.	0	221.286	.417435	.328551	-1.79
27	-86.67	14696.	80	0.	0	221.286	.384267	.302498	-1.85
28	-95.00	14018.	82	0.	0	221.286	.351610	.276662	-1.92
29	-103.33	13243.	84	0.	0	221.286	.319663	.250767	-1.95
30	-111.67	12372.	86	0.	0	221.286	.288542	.225386	-1.89
31	-120.00	11503.	89	0.	0	221.286	.258457	.201086	-1.87
32	-128.89	10532.	92	0.	0	221.286	.227235	.176531	-1.73
33	-137.78	9583.	94	0.	0	221.286	.196340	.153443	-1.69
34	-146.67	8926.	97	0.	0	221.286	.165985	.131678	-1.44
35	-155.56	8213.	97	0.	0	221.286	.136797	.113096	-1.26
36	-164.44	6945.	97	0.	0	221.286	.111251	.097629	-1.10
37	-173.33	6030.	99	0.	0	221.286	.090354	.084439	-.96

39	-191.11	3717.	102	0.	0	221.286	.063123	.062473	-.48

PROB 4 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.25	50.	25.92	16218.	X	0.	8
3.14	100.	50.36	16309.	12	13549.	8
4.08	150.	73.44	16572.	21	12721.	8
4.91	200.	95.22	16632.	20	11705.	7
5.72	250.	115.71	16651.	20	10844.	7
6.55	300.	135.00	16669.	20	9983.	7
7.45	350.	153.16	16687.	20	9146.	7
8.46	400.	170.27	16704.	20	8346.	7
9.58	450.	186.37	16721.	20	7570.	7
12.95	500.	201.52	16737.	20	6969.	6
13.78	550.	215.76	16754.	20	6361.	6
14.57	600.	229.15	16770.	20	5804.	6
15.41	650.	241.72	16786.	20	5242.	6
16.30	700.	253.52	16802.	19	4690.	6
17.23	750.	264.59	16819.	19	3832.	32
18.23	800.	274.96	16836.	19	3358.	32
19.30	850.	284.66	16853.	19	2917.	33
20.43	900.	293.76	16869.	19	2507.	33
21.65	950.	302.25	16886.	19	2112.	33
22.94	1000.	310.18	16902.	19	1733.	33
24.33	1050.	317.56	16919.	19	1364.	33
25.82	1100.	324.44	16935.	19	1019.	34
27.42	1150.	330.85	16952.	19	704.	34
29.14	1200.	336.80	16968.	19	397.	34
31.02	1250.	342.30	16984.	19	95.	34
33.03	1300.	347.39	17000.	19	0.	39
35.25	1350.	352.09	17016.	19	0.	39
37.63	1400.	356.38	17032.	19	0.	39
40.26	1450.	360.28	17048.	19	0.	39
43.13	1500.	363.78	17063.	19	0.	39
46.30	1550.	366.90	17079.	19	0.	39
49.78	1600.	369.52	17095.	19	0.	39
53.63	1650.	371.69	17111.	19	0.	39
57.91	1700.	373.40	17126.	19	0.	39
62.64	1750.	374.54	17142.	19	0.	39
67.99	1800.	375.24	17157.	19	0.	39
73.93	1850.	375.65	17175.	19	0.	39
80.66	1900.	376.00	17192.	19	0.	39
88.32	1950.	376.59	17209.	19	0.	39
96.86	2000.	378.04	17227.	19	0.	39
106.74	2050.	380.73	17244.	19	0.	39
117.91	2100.	383.84	17261.	19	0.	39
130.55	2150.	386.94	17279.	19	0.	39
[illegible]	2200.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

160.22	2250.	393.56	17313.	19	0.	39
177.67	2300.	397.07	17330.	19	0.	39
197.41	2350.	400.50	17347.	19	0.	39
219.83	2400.	404.05	17363.	19	0.	39
246.17	2450.	407.68	17380.	19	0.	39
278.28	2500.	411.27	17397.	19	0.	39
318.09	2550.	414.94	17414.	19	0.	39

PROB 4 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.75IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
130.55	2150.
177.67	2300.
246.17	2450.
278.28	2500.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACMR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB
5 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER
QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 120.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN) *	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.750	90.	0	90
2	1	1.750	100.	90	190
3	1	1.750	50.	190	240
4	1	1.750	80.	240	320

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 5 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	59419510.
3	120.00	0.00	6776.90	221.29	1.00	59419510.
4	111.00	0.00	6776.90	221.29	1.00	59419510.
5	102.00	0.00	6776.90	221.29	1.00	59419510.
6	93.00	0.00	6776.90	221.29	1.00	59419510.
7	84.00	0.00	6776.90	221.29	1.00	59419510.
8	75.00	0.00	6776.90	221.29	1.00	59419510.
9	66.00	0.00	6776.90	221.29	1.00	59419510.
10	57.00	0.00	6776.90	221.29	1.00	59419510.
11	48.00	0.00	6776.90	221.29	1.00	59419510.
12	39.00	0.00	6776.90	221.29	1.00	59419510.
13	30.00	0.00	6274.91	221.29	1.00	64173070.
14	21.67	0.00	6274.91	221.29	1.00	64173070.
15	13.33	0.00	6274.91	221.29	1.00	64173070.
16	5.00	0.00	6274.91	221.29	1.00	64173070.
17	-3.33	0.00	6274.91	221.29	1.00	64173070.
18	-11.67	0.00	6274.91	221.29	1.00	64173070.
19	-20.00	0.00	6274.91	221.29	1.00	64173070.
20	-28.33	0.00	6274.91	221.29	1.00	64173070.
21	-36.67	0.00	6274.91	221.29	1.00	64173070.
22	-45.00	0.00	6274.91	221.29	1.00	64173070.
23	-53.33	0.00	6274.91	221.29	1.00	64173070.
24	-61.67	0.00	6274.91	221.29	1.00	64173070.
25	-70.00	0.00	6274.91	221.29	1.00	64173070.
26	-78.33	0.00	6274.91	221.29	1.00	64173070.
27	-86.67	0.00	6274.91	221.29	1.00	64173070.
28	-95.00	0.00	6274.91	221.29	1.00	64173070.
29	-103.33	0.00	6274.91	221.29	1.00	64173070.
30	-111.67	0.00	6274.91	221.29	1.00	64173070.
31	-120.00	0.00	6693.23	221.29	1.00	60162254.
32	-128.89	0.00	6693.23	221.29	1.00	60162254.
33	-137.78	0.00	6693.23	221.29	1.00	60162254.
34	-146.67	0.00	6693.23	221.29	1.00	60162254.
35	-155.56	0.00	6693.23	221.29	1.00	60162254.
36	-164.44	0.00	6693.23	221.29	1.00	60162254.
37	-173.33	0.00	6693.23	221.29	1.00	60162254.
38	-182.22	0.00	6693.23	221.29	1.00	60162254.
39	-191.11	1000.00	6693.23	221.29	1.00	60162254.

PROB 5 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN.   RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0424 INCHES
NUMBER OF BLOWS PER FOOT = 283.31
TOTAL INTERVALS = 115

SEG	ELEV FT.	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4927002.	19	0.	47	1.000	1.293292	1.293292	-.08
2	0.00	3572030.	26	0.	0	1.000	.972077	.954071	-.88
3	120.00	16164.	28	0.	0	221.286	.951675	.931419	-.97
4	111.00	16181.	30	0.	0	221.286	.940266	.918017	-1.05
5	102.00	16202.	33	0.	0	221.286	.927514	.903651	-1.12
6	93.00	16240.	35	0.	0	221.286	.913350	.888248	-1.19
7	84.00	16270.	37	0.	0	221.286	.897804	.871765	-1.24
8	75.00	16283.	39	0.	0	221.286	.880877	.854107	-1.27
9	66.00	16305.	41	0.	0	221.286	.862822	.835334	-1.29
10	57.00	16328.	43	0.	0	221.286	.843989	.815340	-1.28
11	48.00	16371.	46	0.	0	221.286	.825750	.794200	-1.28
12	39.00	16425.	48	0.	0	221.286	.810178	.771819	-1.24
13	30.00	16465.	50	0.	0	221.286	.795612	.748257	-1.21
14	21.67	16534.	52	0.	0	221.286	.781534	.725535	-1.17
15	13.33	16646.	54	0.	0	221.286	.766504	.701990	-1.12
16	5.00	16806.	56	0.	0	221.286	.750161	.677853	-1.11
17	-3.33	16960.	58	0.	0	221.286	.732249	.653278	-1.10
18	-11.67	17057.	60	0.	0	221.286	.712710	.628347	-1.10
19	-20.00	17096.	62	0.	0	221.286	.691605	.603391	-1.13
20	-28.33	17080.	65	0.	0	221.286	.669526	.578553	-1.16
21	-36.67	17015.	67	0.	0	221.286	.645987	.553819	-1.20
22	-45.00	16894.	69	0.	0	221.286	.621338	.529411	-1.24
23	-53.33	16717.	71	0.	0	221.286	.595730	.505478	-1.27
24	-61.67	16485.	73	0.	0	221.286	.569299	.481904	-1.31
25	-70.00	16206.	75	0.	0	221.286	.542281	.458781	-1.39
26	-78.33	15872.	77	0.	0	221.286	.514887	.435955	-1.53
27	-86.67	15465.	79	0.	0	221.286	.487212	.412897	-1.70
28	-95.00	15006.	81	0.	0	221.286	.459546	.389406	-1.91
29	-103.33	14492.	83	0.	0	221.286	.432062	.365413	-2.10
30	-111.67	13917.	86	0.	0	221.286	.405010	.341239	-2.19
31	-120.00	13352.	88	0.	0	221.286	.378650	.317178	-2.20
32	-128.89	12710.	90	0.	0	221.286	.351355	.291849	-2.15
33	-137.78	11945.	92	0.	0	221.286	.323346	.267168	-2.10
34	-146.67	11096.	95	0.	0	221.286	.293307	.243196	-1.90
35	-155.56	10943.	99	0.	0	221.286	.260855	.220329	-1.68
36	-164.44	10894.	100	0.	0	221.286	.227661	.198365	-1.57
37	-173.33	10349.	100	0.	0	221.286	.195574	.176750	-1.44
38	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

30 -191.11 8501. 101 0. 0 221.286 .142356 .135873 -1.00

PROB 5 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.98	50.	64.65	16231.	12	14280.	8
2.79	100.	125.39	16337.	13	13391.	8
3.84	150.	182.53	16615.	22	12509.	8
4.98	200.	236.23	16631.	21	11369.	8
5.91	250.	286.64	16644.	21	10394.	7
6.85	300.	333.98	16656.	21	9451.	7
7.90	350.	378.45	16668.	20	8548.	7
9.09	400.	420.27	16681.	20	7697.	7
10.42	450.	459.56	16694.	20	6880.	7
13.94	500.	496.47	16707.	20	6198.	6
15.04	550.	531.15	16719.	20	5564.	6
16.02	600.	563.72	16732.	20	4961.	6
17.06	650.	594.30	16744.	20	4358.	6
18.18	700.	622.99	16756.	20	3064.	7
19.38	750.	649.90	16769.	20	2447.	7
20.66	800.	675.10	16781.	20	1805.	32
22.05	850.	698.70	16793.	20	1318.	32
23.54	900.	720.81	16805.	20	854.	32
25.17	950.	741.49	16817.	20	409.	32
26.93	1000.	760.74	16829.	20	0.	39
28.84	1050.	778.69	16841.	20	0.	39
30.93	1100.	795.44	16853.	20	0.	39
33.22	1150.	811.04	16865.	19	0.	39
35.73	1200.	825.48	16878.	19	0.	39
38.49	1250.	838.80	16890.	19	0.	39
41.56	1300.	851.11	16903.	19	0.	39
44.98	1350.	862.49	16915.	19	0.	39
48.80	1400.	873.17	16927.	19	0.	39
53.10	1450.	883.09	16940.	19	0.	39
57.98	1500.	892.27	16952.	19	0.	39
63.51	1550.	900.82	16964.	19	0.	39
69.93	1600.	908.62	16976.	19	0.	39
77.25	1650.	915.79	16988.	19	0.	39
85.94	1700.	922.23	17001.	19	0.	39
96.00	1750.	927.51	17013.	19	0.	39
108.16	1800.	932.00	17025.	19	0.	39
122.76	1850.	936.30	17037.	19	0.	39
140.70	1900.	939.38	17049.	19	0.	39
163.41	1950.	941.20	17060.	19	0.	39
191.92	2000.	941.39	17072.	19	0.	39
230.57	2050.	940.72	17084.	19	0.	39
283.31	2100.	940.62	17096.	19	0.	39
359.58	2150.	948.49	17108.	19	0.	39

2125

PROB 5 42-IN, DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.10 ,MINIMUM WALL THICKNESS=1.75IN, RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
140.70	1900.
191.92	2000.
230.57	2050.
283.31	2100.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND REPORT DATA FOR ACHR 3-PILE STRUCTURE -- BORING 1
MAY 25,1976

PROB
6   42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER
QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN.   RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 060 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	9200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOO)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

```
NUMBER OF SECTIONS CHANGED              0
NUMBER OF SECTIONS ADDED                0
LENGTH OF FREE STANDING PILE(FT)        120.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.750	90.	0	90
2	1	1.750	100.	90	190
3	1	1.750	50.	190	240
4	1	1.750	80.	240	320

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES     1
SIDE DAMPENING RESISTANCE  = JSIDE      .15
POINT DAMPENING RESISTANCE = JPONT      .15
SOIL QUAKE FOR SIDE        = QSIDE      .10
SOIL QUAKE FOR POINT       = QPOINT     .30
```

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS   4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 6 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	HEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	9200000.
2	0.00	1000.00	42000.00	1.00	.90	59419510.
3	120.00	0.00	6776.90	221.29	1.00	59419510.
4	111.00	0.00	6776.90	221.29	1.00	59419510.
5	102.00	0.00	6776.90	221.29	1.00	59419510.
6	93.00	0.00	6776.90	221.29	1.00	59419510.
7	84.00	0.00	6776.90	221.29	1.00	59419510.
8	75.00	0.00	6776.90	221.29	1.00	59419510.
9	66.00	0.00	6776.90	221.29	1.00	59419510.
10	57.00	0.00	6776.90	221.29	1.00	59419510.
11	48.00	0.00	6776.90	221.29	1.00	59419510.
12	39.00	0.00	6776.90	221.29	1.00	59419510.
13	30.00	0.00	6274.91	221.29	1.00	64173070.
14	21.67	0.00	6274.91	221.29	1.00	64173070.
15	13.33	0.00	6274.91	221.29	1.00	64173070.
16	5.00	0.00	6274.91	221.29	1.00	64173070.
17	-3.33	0.00	6274.91	221.29	1.00	64173070.
18	-11.67	0.00	6274.91	221.29	1.00	64173070.
19	-20.00	0.00	6274.91	221.29	1.00	64173070.
20	-28.33	0.00	6274.91	221.29	1.00	64173070.
21	-36.67	0.00	6274.91	221.29	1.00	64173070.
22	-45.00	0.00	6274.91	221.29	1.00	64173070.
23	-53.33	0.00	6274.91	221.29	1.00	64173070.
24	-61.67	0.00	6274.91	221.29	1.00	64173070.
25	-70.00	0.00	6274.91	221.29	1.00	64173070.
26	-78.33	0.00	6274.91	221.29	1.00	64173070.
27	-86.67	0.00	6274.91	221.29	1.00	64173070.
28	-95.00	0.00	6274.91	221.29	1.00	64173070.
29	-103.33	0.00	6274.91	221.29	1.00	64173070.
30	-111.67	0.00	6274.91	221.29	1.00	64173070.
31	-120.00	0.00	6693.23	221.29	1.00	60162254.
32	-128.89	0.00	6693.23	221.29	1.00	60162254.
33	-137.78	0.00	6693.23	221.29	1.00	60162254.
34	-146.67	0.00	6693.23	221.29	1.00	60162254.
35	-155.56	0.00	6693.23	221.29	1.00	60162254.
36	-164.44	0.00	6693.23	221.29	1.00	60162254.
37	-173.33	0.00	6693.23	221.29	1.00	60162254.
38	-182.22	0.00	6693.23	221.29	1.00	60162254.
39	-191.11	1000.00	6693.23	221.29	1.00	60162254.

PROB 6 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0421 INCHES
NUMBER OF BLOWS PER FOOT = 285.15
TOTAL INTERVALS = 121

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4927002.	19	0.	47	1.000	1.323216	1.323216	-.05
2	0.00	3572030.	26	0.	0	1.000	.998341	.981910	-.63
3	120.00	16164.	28	0.	0	221.286	.980067	.961264	-.71
4	111.00	16181.	30	0.	0	221.286	.971350	.950570	-.79
5	102.00	16202.	33	0.	0	221.286	.961602	.939282	-.86
6	93.00	16240.	35	0.	0	221.286	.950769	.927368	-.93
7	84.00	16270.	37	0.	0	221.286	.938786	.914799	-.98
8	75.00	16283.	39	0.	0	221.286	.925556	.901502	-1.01
9	66.00	16305.	41	0.	0	221.286	.911134	.887501	-1.04
10	57.00	16328.	43	0.	0	221.286	.895427	.872587	-1.04
11	48.00	16371.	46	0.	0	221.286	.878587	.856851	-1.04
12	39.00	16424.	48	0.	0	221.286	.860596	.840158	-1.01
13	30.00	16458.	50	0.	0	221.286	.841814	.822529	-.98
14	21.67	16509.	52	0.	0	221.286	.824328	.805304	-.92
15	13.33	16587.	54	0.	0	221.286	.809623	.787105	-.86
16	5.00	16693.	56	0.	0	221.286	.795844	.768040	-.80
17	-3.33	16796.	58	0.	0	221.286	.781477	.748147	-.72
18	-11.67	16865.	60	0.	0	221.286	.766345	.727542	-.65
19	-20.00	16899.	62	0.	0	221.286	.750255	.706580	-.57
20	-28.33	16898.	64	0.	0	221.286	.733158	.685581	-.46
21	-36.67	16862.	66	0.	0	221.286	.715177	.664979	-.35
22	-45.00	16792.	68	0.	0	221.286	.696412	.645249	-.25
23	-53.33	16687.	70	0.	0	221.286	.676915	.626535	-.19
24	-61.67	16558.	73	0.	0	221.286	.656829	.608665	-.23
25	-70.00	16404.	75	0.	0	221.286	.636290	.591309	-.39
26	-78.33	16215.	77	0.	0	221.286	.615257	.573875	-.61
27	-86.67	15973.	79	0.	0	221.286	.593966	.556118	-.82
28	-95.00	15696.	81	0.	0	221.286	.572521	.538439	-.98
29	-103.33	15374.	83	0.	0	221.286	.551740	.521102	-1.11
30	-111.67	15021.	85	0.	0	221.286	.534536	.504072	-1.29
31	-120.00	14659.	87	0.	0	221.286	.519763	.486844	-1.55
32	-128.89	14244.	89	0.	0	221.286	.502778	.467683	-1.83
33	-137.78	13690.	91	0.	0	221.286	.484048	.447883	-1.90
34	-146.67	12832.	92	0.	0	221.286	.464398	.428252	-1.80
35	-155.56	11642.	93	0.	0	221.286	.443704	.409202	-1.80
36	-164.44	11175.	99	0.	0	221.286	.420602	.389816	-1.85
37	-173.33	10886.	101	0.	0	221.286	.394662	.369519	-1.73

39	-191.11	11326.	106	0.	0	221.286	.342083	.327570	-1.33

PROB 6 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.79	50.	92.22	16274.	12	14233.	9
2.49	100.	178.62	16357.	13	13259.	8
3.41	150.	259.69	16641.	26	12335.	8
4.60	200.	335.74	16635.	22	11136.	8
6.10	250.	407.90	16643.	22	10119.	7
7.38	300.	473.74	16651.	21	9177.	7
8.72	350.	536.34	16660.	21	8232.	7
10.29	400.	595.18	16668.	21	7352.	7
12.11	450.	650.47	16677.	21	6524.	7
16.67	500.	702.46	16685.	21	5714.	7
18.42	550.	751.34	16694.	20	4940.	7
19.96	600.	797.26	16704.	20	4229.	7
21.63	650.	840.38	16714.	20	3548.	7
23.45	700.	880.89	16723.	20	2065.	4
25.46	750.	918.53	16733.	20	1621.	4
27.68	800.	953.84	16742.	20	775.	31
30.15	850.	986.60	16752.	20	246.	32
32.91	900.	1016.83	16761.	20	0.	39
36.02	950.	1045.03	16770.	20	0.	39
39.53	1000.	1070.78	16780.	20	0.	39
43.52	1050.	1094.54	16789.	20	0.	39
48.11	1100.	1117.72	16798.	20	0.	39
53.41	1150.	1149.79	16808.	20	0.	39
59.65	1200.	1175.88	16817.	20	0.	39
66.95	1250.	1195.63	16826.	20	0.	39
75.82	1300.	1224.43	16835.	20	0.	39
86.52	1350.	1228.24	16844.	20	0.	39
99.93	1400.	1252.67	16853.	20	0.	39
116.97	1450.	1250.15	16862.	20	0.	39
139.41	1500.	1262.83	16871.	20	0.	39
170.33	1550.	1263.88	16880.	20	0.	39
214.96	1575 1600.	1257.76	16889.	19	0.	39
285.15	1650.	1253.14	16899.	19	0.	39
410.68	1700.	1239.47	16908.	19	0.	39

1200

PROB 6 42-IN. DIAMETER PILES 3-PILE STRUCTURE
200FT PENETRATION -- VULCAN 060 HAMMER

QTIP=.30 ,MINIMUM WALL THICKNESS=1.75IN, RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
139.41	1500.
214.96	1600.
245.76	1625.
285.15	1650.

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	- 1.00 in.
Penetration	- 150 ft.
	- 200 ft.
Hammer	- Vulcan 560
Quake Factor, tip	- .025 in.
	- 0.10 in.
	- 0.30 in.

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UNITED COMPUTING 67, APEX/SL 8,2,0

16,04,07.   06/08/76.

JYJOGQI

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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

 PROB
   1      42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
          150FT PENETRATION -- VULCAN 560 HAMMER
          QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN.   RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                            1
     NEW HAMMER DATA OPTION               1
     NEW MATERIAL DATA OPTION             1
     NEW PILE SECTION DATA OPTION         1
     NEW SOIL DATA OPTION                 1
     SPECIFIED BLOW COUNT OPTION          1
     OUTPUT OPTION FOR STRESS             1
     BPF FOR STRESS OUTPUT OPTION                     275.
     ULTIMATE RESISTANCE INCREMENT (TONS)             50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)        300.
     SPECIFIED SEGMENT LENGTH (FT)                    -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION             VULCAN 560 HAMMER
     HAMMER EFFICIENCY                     .75
     HAMMER ENERGY (FT-LBS)          300000.00
     HAMMER EXPLOSIVE FORCE (LBS)        -0.00
     NUMBER OF HAMMER SEGMENTS               2

     SEGMENT      SLACK      WEIGHT      AREA    COEF OF      SPRING CONSTANT
      NUMBER      (IN)        (LB)     (SQ IN) RESTITUTION      (LB / IN)

        1        1000.00  60000.00      1.00       .60        6200000.00
        2        1000.00  42000.00      1.00       .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                  (PCF)     (PSI)

             1         42.000    490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS =    4
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.250	30.	0	30
2	1	1.500	50.	30	80
3	1	1.500	50.	80	130
4	1	1.250	50.	130	180
5	1	1.250	50.	180	230
6	1	1.000	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE - JSIDE .15
POINT DAMPENING RESISTANCE - JPONT .15
SOIL QUAKE FOR SIDE - QSIDE .10
SOIL QUAKE FOR POINT - QPOINT .03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN. DIAMETER PILES ML=-105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=0.025, MINIMUM WALL THICKNESS=1.00 IN. RU = 10

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	38672769.
3	160.00	0.00	5445.30	160.03	1.00	38672769.
4	150.00	0.00	5445.30	160.03	1.00	38672769.
5	140.00	0.00	5445.30	160.03	1.00	38672769.
6	130.00	0.00	5411.90	190.85	1.00	55347138.
7	121.67	0.00	5411.90	190.85	1.00	55347138.
8	113.33	0.00	5411.90	190.85	1.00	55347138.
9	105.00	0.00	5411.90	190.85	1.00	55347138.
10	96.67	0.00	5411.90	190.85	1.00	55347138.
11	88.33	0.00	5411.90	190.85	1.00	55347138.
12	80.00	0.00	5411.90	190.85	1.00	55347138.
13	71.67	0.00	5411.90	190.85	1.00	55347138.
14	63.33	0.00	5411.90	190.85	1.00	55347138.
15	55.00	0.00	5411.90	190.85	1.00	55347138.
16	46.67	0.00	5411.90	190.85	1.00	55347138.
17	38.33	0.00	5411.90	190.85	1.00	55347138.
18	30.00	0.00	4537.75	160.03	1.00	46407322.
19	21.67	0.00	4537.75	160.03	1.00	46407322.
20	13.33	0.00	4537.75	160.03	1.00	46407322.
21	5.00	0.00	4537.75	160.03	1.00	46407322.
22	-3.33	0.00	4537.75	160.03	1.00	46407322.
23	-11.67	0.00	4537.75	160.03	1.00	46407322.
24	-20.00	0.00	4537.75	160.03	1.00	46407322.
25	-28.33	0.00	4537.75	160.03	1.00	46407322.
26	-36.67	0.00	4537.75	160.03	1.00	46407322.
27	-45.00	0.00	4537.75	160.03	1.00	46407322.
28	-53.33	0.00	4537.75	160.03	1.00	46407322.
29	-61.67	0.00	4537.75	160.03	1.00	46407322.
30	-70.00	0.00	3895.97	128.81	1.00	35019022.
31	-78.89	0.00	3895.97	128.81	1.00	35019022.
32	-87.78	0.00	3895.97	128.81	1.00	35019022.
33	-96.67	0.00	3895.97	128.81	1.00	35019022.
34	-105.56	0.00	3895.97	128.81	1.00	35019022.
35	-114.44	0.00	3895.97	128.81	1.00	35019022.
36	-123.33	0.00	3895.97	128.81	1.00	35019022.
37	-132.22	0.00	3895.97	128.81	1.00	35019022.
38	-141.11	1000.00	3895.97	128.81	1.00	35019022.

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0383 INCHES
NUMBER OF BLOWS PER FOOT = 312.96
TOTAL INTERVALS = 263

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4015907.	25	0.	263	1.000	1.638326	-1.524873	-15.54
2	0.00	2878813.	36	0.	263	1.000	1.215005	.166196	-3.06
3	160.00	18366.	38	467.	208	160.025	1.180547	.243041	-2.35
4	150.00	18695.	41	702.	210	160.025	1.157890	.243131	-2.35
5	140.00	18918.	43	752.	212	160.025	1.135125	.243238	-2.34
6	130.00	15885.	45	426.	214	190.852	1.113912	.243450	-2.36
7	121.67	15911.	48	293.	247	190.852	1.099211	.243739	-2.33
8	113.33	15984.	50	320.	251	190.852	1.083562	.244189	-2.35
9	105.00	15970.	52	321.	254	190.852	1.067352	.244915	-2.32
10	96.67	15976.	54	410.	262	190.852	1.051526	.245953	-2.32
11	88.33	15912.	56	492.	263	190.852	1.037343	.247362	-2.33
12	80.00	15742.	58	573.	261	190.852	1.024326	.249059	-2.33
13	71.67	15522.	60	622.	263	190.852	1.011263	.250921	-2.34
14	63.33	15293.	62	627.	263	190.852	.997493	.253066	-2.34
15	55.00	15068.	65	660.	263	190.852	.982288	.255230	-2.31
16	46.67	14921.	67	661.	263	190.852	.965240	.257505	-2.30
17	38.33	14886.	70	605.	263	190.852	.945771	.259786	-2.27
18	30.00	17936.	72	692.	242	160.025	.923483	.261872	-2.21
19	21.67	18238.	75	754.	244	160.025	.893985	.264185	-2.14
20	13.33	18691.	77	821.	246	160.025	.861235	.266147	-2.03
21	5.00	19263.	80	895.	249	160.025	.825258	.267756	-1.93
22	-3.33	19775.	82	873.	251	160.025	.786219	.269528	-1.90
23	-11.67	20001.	84	650.	253	160.025	.744732	.271219	-1.83
24	-20.00	19973.	87	272.	256	160.025	.700982	.272017	-1.75
25	-28.33	19814.	89	0.	0	160.025	.655697	.271652	-1.74
26	-36.67	19410.	91	0.	0	160.025	.608899	.270036	-1.79
27	-45.00	18653.	94	0.	0	160.025	.561208	.266902	-1.84
28	-53.33	17853.	96	0.	0	160.025	.512774	.261451	-1.83
29	-61.67	17007.	99	0.	0	160.025	.464064	.252598	-1.72
30	-70.00	19777.	102	0.	0	128.806	.415139	.238975	-1.48
31	-78.89	18310.	106	0.	0	128.806	.352175	.215073	-1.17
32	-87.78	16803.	108	0.	0	128.806	.291965	.187163	-.89
33	-96.67	15167.	109	0.	0	128.806	.236944	.157449	-.68
34	-105.56	13006.	110	0.	0	128.806	.187802	.128130	-.51
35	-114.44	10793.	114	0.	0	128.806	.144699	.101089	-.38
36	-123.33	8370.	114	0.	0	128.806	.110097	.078101	-.26
37	-132.22	6270.	116	0.	0	128.806	.083352	.060782	-.17
38	-141.11	4837.	[illegible]	0.	0	[illegible]	[illegible]	[illegible]	[illegible]

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,025,MINIMUM WALL THICKNESS=1,00 IN, RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14,00

BLOWS/FT,	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ,IN,	SEG NO,	MAX T STRESS LBS/SQ,IN,	SEG NO,
1,85	50,	28,68	19058,	30	16439,	30
2,64	100,	54,87	19620,	30	14326,	30
3,61	150,	78,60	19845,	30	12371,	30
4,64	200,	100,07	19917,	30	10556,	30
5,56	250,	119,56	19965,	30	8893,	30
6,72	300,	137,27	20004,	30	7360,	30
7,99	350,	153,37	20051,	30	5943,	30
9,46	400,	168,01	20092,	30	4630,	30
11,28	450,	181,32	20129,	30	3411,	30
12,20	500,	193,42	20157,	30	2310,	31
13,20	550,	204,43	20182,	30	1418,	4
14,30	600,	214,43	20203,	30	810,	3
15,50	650,	223,51	20217,	30	265,	3
16,82	700,	231,75	20235,	30	0,	38
18,28	750,	239,19	20256,	30	0,	38
19,90	800,	245,89	20268,	30	0,	38
21,70	850,	251,89	20277,	30	0,	38
23,71	900,	257,22	20282,	30	0,	38
25,97	950,	261,86	20282,	30	0,	38
28,52	1000,	265,90	20278,	30	0,	38
31,40	1050,	269,42	20271,	30	0,	38
34,69	1100,	272,51	20263,	30	0,	38
38,45	1150,	275,12	20258,	30	0,	38
42,80	1200,	277,35	20250,	30	0,	38
47,85	1250,	279,28	20236,	30	0,	38
53,75	1300,	280,86	20219,	30	511,	20
60,71	1350,	281,87	20199,	30	521,	21
68,97	1400,	282,07	20174,	30	644,	21
78,87	1450,	281,41	20146,	30	752,	21
90,80	1500,	280,76	20113,	30	765,	21
105,23	1550,	284,35	20075,	30	759,	21
122,76	1600,	289,11	20047,	30	757,	21
143,75	1650,	293,91	20014,	30	773,	21
167,14	1700,	298,30	19976,	30	781,	21
194,10	1750,	301,88	19939,	30	795,	21
225,92	1800,	305,26	19890,	23	834,	21
263,92	1850,	308,47	19946,	23	873,	21
312,96	1900,	311,53	20001,	23	895,	21

```
PROB             1      42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
        150FT PENETRATION -- VULCAN 560 HAMMER

        QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN.   RU = 14

    TABLE 10 -- SPECIFIED BLOW DATA

        TIP RESISTANCE PERCENTAGE =     14.00
```

BLOWS PER FOOT	RESISTANCE TONS
143.75	1650.
194.10	1750.
225.92	1800.
312.96	1900.

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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

 PROB
   2      42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
          150FT PENETRATION -- VULCAN 560 HAMMER
          QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN.   RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                                1
     NEW HAMMER DATA OPTION                   1
     NEW MATERIAL DATA OPTION                 1
     NEW PILE SECTION DATA OPTION             1
     NEW SOIL DATA OPTION                     1
     SPECIFIED BLOW COUNT OPTION              1
     OUTPUT OPTION FOR STRESS                 1
     BPF FOR STRESS OUTPUT OPTION                        275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                 50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)           300.
     SPECIFIED SEGMENT LENGTH (FT)                        -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION           VULCAN 560 HAMMER
     HAMMER EFFICIENCY                   .75
     HAMMER ENERGY (FT-LBS)        300000.00
     HAMMER EXPLOSIVE FORCE (LBS)      -0.00
     NUMBER OF HAMMER SEGMENTS             2

     SEGMENT     SLACK      WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER      (IN)       (LB)     (SQ IN) RESTITUTION     (LB / IN)

        1       1000.00  60000.00      1.00       .60        6200000.00
        2       1000.00  42000.00      1.00       .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =    1

        MATERIAL      (TUD)   UNIT WT.   MODULUS
          TYPE                 (PCF)      (PSI)

            1        42.000    490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
ENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.250	30.	0	30
2	1	1.500	50.	30	80
3	1	1.500	50.	80	130
4	1	1.250	50.	130	180
5	1	1.250	50.	180	230
6	1	1.000	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	38672769.
3	160.00	0.00	5445.30	160.03	1.00	38672769.
4	150.00	0.00	5445.30	160.03	1.00	38672769.
5	140.00	0.00	5445.30	160.03	1.00	38672769.
6	130.00	0.00	5411.90	190.85	1.00	55347138.
7	121.67	0.00	5411.90	190.85	1.00	55347138.
8	113.33	0.00	5411.90	190.85	1.00	55347138.
9	105.00	0.00	5411.90	190.85	1.00	55347138.
10	96.67	0.00	5411.90	190.85	1.00	55347138.
11	88.33	0.00	5411.90	190.85	1.00	55347138.
12	80.00	0.00	5411.90	190.85	1.00	55347138.
13	71.67	0.00	5411.90	190.85	1.00	55347138.
14	63.33	0.00	5411.90	190.85	1.00	55347138.
15	55.00	0.00	5411.90	190.85	1.00	55347138.
16	46.67	0.00	5411.90	190.85	1.00	55347138.
17	38.33	0.00	5411.90	190.85	1.00	55347138.
18	30.00	0.00	4537.75	160.03	1.00	46407322.
19	21.67	0.00	4537.75	160.03	1.00	46407322.
20	13.33	0.00	4537.75	160.03	1.00	46407322.
21	5.00	0.00	4537.75	160.03	1.00	46407322.
22	-3.33	0.00	4537.75	160.03	1.00	46407322.
23	-11.67	0.00	4537.75	160.03	1.00	46407322.
24	-20.00	0.00	4537.75	160.03	1.00	46407322.
25	-28.33	0.00	4537.75	160.03	1.00	46407322.
26	-36.67	0.00	4537.75	160.03	1.00	46407322.
27	-45.00	0.00	4537.75	160.03	1.00	46407322.
28	-53.33	0.00	4537.75	160.03	1.00	46407322.
29	-61.67	0.00	4537.75	160.03	1.00	46407322.
30	-70.00	0.00	3895.97	128.81	1.00	35019022.
31	-78.89	0.00	3895.97	128.81	1.00	35019022.
32	-87.78	0.00	3895.97	128.81	1.00	35019022.
33	-96.67	0.00	3895.97	128.81	1.00	35019022.
34	-105.56	0.00	3895.97	128.81	1.00	35019022.
35	-114.44	0.00	3895.97	128.81	1.00	35019022.
36	-123.33	0.00	3895.97	128.81	1.00	35019022.
37	-132.22	0.00	3895.97	128.81	1.00	35019022.
38	-141.11	1000.00	3895.97	128.81	1.00	35019022.

PROB 2 42-IN. DIAMETER PILES MLW=10SFT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN. RU = 35

TABLE B -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0404 INCHES
NUMBER OF BLOWS PER FOOT = 297.04
TOTAL INTERVALS = 265

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4019907.	25	0.	265	1.000	1.662090	-1.150906	-15.54
2	0.00	2878811.	36	0.	265	1.000	1.237022	.321892	-2.95
3	160.00	10366.	38	537.	216	160.025	1.206287	.382327	-2.48
4	150.00	18695.	41	712.	218	160.025	1.186955	.382525	-2.46
5	140.00	16918.	43	715.	220	160.025	1.166157	.383136	-2.48
6	130.00	15884.	45	472.	222	190.852	1.144536	.383742	-2.47
7	121.67	15911.	48	320.	224	190.852	1.129527	.384205	-2.49
8	113.33	15944.	50	248.	227	190.852	1.114859	.384882	-2.50
9	105.00	15970.	52	208.	265	190.852	1.099637	.385574	-2.48
10	96.67	15976.	54	269.	265	190.852	1.083513	.386290	-2.44
11	88.33	15912.	56	322.	265	190.852	1.066919	.387219	-2.43
12	80.00	15742.	58	337.	265	190.852	1.050963	.388331	-2.39
13	71.67	15522.	60	319.	265	190.852	1.037143	.389491	-2.33
14	63.33	15203.	62	312.	265	190.852	1.024071	.390591	-2.28
15	55.00	15068.	65	307.	243	190.852	1.010617	.391666	-2.25
16	46.67	14916.	67	309.	245	190.852	.996242	.392477	-2.19
17	38.33	14880.	70	360.	248	190.852	.980566	.392966	-2.11
18	30.00	17853.	72	511.	250	160.025	.963235	.393183	-2.07
19	21.67	18094.	74	581.	252	160.025	.940630	.393340	-2.05
20	13.33	18349.	77	626.	254	160.025	.915904	.393533	-2.05
21	5.00	18737.	79	658.	256	160.025	.889310	.393540	-2.00
22	-3.33	19068.	81	613.	258	160.025	.860579	.393438	-2.00
23	-11.67	19194.	83	444.	260	160.025	.829604	.393576	-2.11
24	-20.00	19130.	86	137.	262	160.025	.796612	.393982	-2.25
25	-28.33	18952.	88	0.	0	160.025	.761382	.394096	-2.36
26	-36.67	18643.	90	0.	0	160.025	.724150	.393197	-2.37
27	-45.00	18109.	93	0.	0	160.025	.684984	.390315	-2.29
28	-53.33	17562.	95	0.	0	160.025	.644199	.384375	-2.10
29	-61.67	17027.	98	0.	0	160.025	.601788	.374560	-1.83
30	-70.00	20326.	101	0.	0	128.806	.557820	.360300	-1.52
31	-78.89	19335.	104	0.	0	128.806	.498846	.335572	-1.17
32	-87.78	18467.	107	0.	0	128.806	.440064	.306355	-.89
33	-96.67	17778.	110	0.	0	128.806	.383170	.274196	-.70
34	-105.56	16606.	110	0.	0	128.806	.327857	.240467	-.56
35	-114.44	15379.	112	0.	0	128.806	.273793	.206395	-.43
36	-123.33	14167.	118	0.	0	128.806	.221884	.173157	-.30
37	-132.22	13133.	117	0.	0	128.806	.177870	.142006	-.19

PROB 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,100,MINIMUM WALL THICKNESS=1,00 IN, RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35,00

BLOWS/FT,	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ,IN,	SEG NO,	MAX T STRESS LBS/SQ,IN,	SEG NO,
1,78	50,	71,46	19100,	30	16140,	30
2,55	100,	136,39	19769,	30	13829,	30
3,55	150,	194,73	19919,	30	11666,	30
4,73	200,	247,29	19971,	30	9692,	30
5,78	250,	294,82	20011,	30	7886,	30
7,14	300,	337,86	20044,	30	6226,	30
8,66	350,	376,87	20075,	30	4697,	30
10,35	400,	412,25	20103,	30	3295,	30
12,17	450,	444,36	20139,	30	2150,	5
13,27	500,	473,50	20170,	30	1327,	4
14,48	550,	499,95	20197,	30	697,	4
15,81	600,	523,97	20220,	30	215,	3
17,30	650,	545,74	20243,	30	0,	38
18,96	700,	565,49	20263,	30	0,	38
20,83	750,	583,39	20279,	30	0,	38
22,93	800,	599,60	20291,	30	0,	38
25,33	850,	614,28	20301,	30	0,	38
28,06	900,	627,55	20315,	30	0,	38
31,20	950,	639,50	20331,	30	0,	38
34,83	1000,	650,15	20342,	30	0,	38
39,08	1050,	659,48	20351,	30	0,	38
44,08	1100,	667,47	20358,	30	0,	38
50,03	1150,	674,15	20363,	30	0,	38
57,19	1200,	679,49	20365,	30	0,	38
65,94	1250,	684,06	20365,	30	0,	38
76,81	1300,	687,89	20363,	30	0,	38
90,62	1350,	691,08	20359,	30	0,	38
108,61	1400,	693,83	20352,	30	0,	38
132,78	1450,	696,03	20345,	30	0,	38
166,65	1500,	697,09	20341,	30	0,	38
216,71	1550,	695,95	20335,	30	167,	3
297,04	1600,	692,69	20326,	30	715,	5
442,65	1650,	690,97	20315,	30	780,	5

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PROB           2      42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
        150FT PENETRATION -- VULCAN 560 HAMMER

        QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN.   RU = 35

     TABLE 10 -- SPECIFIED BLOW DATA

        TIP RESISTANCE PERCENTAGE =      35.00

              BLOWS PER            RESISTANCE
                FOOT                  TONS

               132.78                 1450.
               216.71                 1550.
               245.01                 1571.
               297.04                 1600.
```

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 6

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160,00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1,250	30.	0	30
2	1	1,500	50.	30	80
3	1	1,500	50.	80	130
4	1	1,250	50.	130	180
5	1	1,250	50.	180	230
6	1	1,000	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .30

TIP RESISTANCE PERCENTAGE

50,0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	38672769.
3	160.00	0.00	5445.30	160.03	1.00	38672769.
4	150.00	0.00	5445.30	160.03	1.00	38672769.
5	140.00	0.00	5445.30	160.03	1.00	38672769.
6	130.00	0.00	5411.90	190.85	1.00	55347138.
7	121.67	0.00	5411.90	190.85	1.00	55347138.
8	113.33	0.00	5411.90	190.85	1.00	55347138.
9	105.00	0.00	5411.90	190.85	1.00	55347138.
10	96.67	0.00	5411.90	190.85	1.00	55347138.
11	88.33	0.00	5411.90	190.85	1.00	55347138.
12	80.00	0.00	5411.90	190.85	1.00	55347138.
13	71.67	0.00	5411.90	190.85	1.00	55347138.
14	63.33	0.00	5411.90	190.85	1.00	55347138.
15	55.00	0.00	5411.90	190.85	1.00	55347138.
16	46.67	0.00	5411.90	190.85	1.00	55347138.
17	38.33	0.00	5411.90	190.85	1.00	55347138.
18	30.00	0.00	4537.75	160.03	1.00	46407322.
19	21.67	0.00	4537.75	160.03	1.00	46407322.
20	13.33	0.00	4537.75	160.03	1.00	46407322.
21	5.00	0.00	4537.75	160.03	1.00	46407322.
22	-3.33	0.00	4537.75	160.03	1.00	46407322.
23	-11.67	0.00	4537.75	160.03	1.00	46407322.
24	-20.00	0.00	4537.75	160.03	1.00	46407322.
25	-28.33	0.00	4537.75	160.03	1.00	46407322.
26	-36.67	0.00	4537.75	160.03	1.00	46407322.
27	-45.00	0.00	4537.75	160.03	1.00	46407322.
28	-53.33	0.00	4537.75	160.03	1.00	46407322.
29	-61.67	0.00	4537.75	160.03	1.00	46407322.
30	-70.00	0.00	3895.97	128.81	1.00	35019022.
31	-78.89	0.00	3895.97	128.81	1.00	35019022.
32	-87.78	0.00	3895.97	128.81	1.00	35019022.
33	-96.67	0.00	3895.97	128.81	1.00	35019022.
34	-105.56	0.00	3895.97	128.81	1.00	35019022.
35	-114.44	0.00	3895.97	128.81	1.00	35019022.
36	-123.33	0.00	3895.97	128.81	1.00	35019022.
37	-132.22	0.00	3895.97	128.81	1.00	35019022.
38	-141.11	1000.00	3895.97	128.81	1.00	35019022.

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0293 INCHES
NUMBER OF BLOWS PER FOOT = 409.17
TOTAL INTERVALS = 210

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4015907.	25	0.	126	1.000	1.693955	1.058902	-3.74
2	0.00	2473813.	36	0.	0	1.000	1.265637	.985598	-2.97
3	15[illegible]	19349.	38	0.	0	160.025	1.238999	.954993	-2.57
4	150.00	18695.	41	0.	0	160.025	1.223977	.940354	-2.00
5	140.00	18913.	43	0.	0	160.025	1.207525	.924339	-1.58
6	130.00	15885.	45	0.	0	190.852	1.189794	.907425	-1.18
7	121.67	15911.	48	0.	0	190.852	1.176558	.895353	-.96
8	113.33	15744.	50	0.	0	190.852	1.162437	.883726	-.82
9	105.00	15979.	52	0.	0	190.852	1.147529	.872277	-.72
10	96.67	15979.	54	0.	0	190.852	1.132164	.860439	-.59
11	88.33	15912.	56	0.	0	190.852	1.116921	.848039	-.41
12	80.00	15742.	58	0.	0	190.852	1.101689	.835116	-.27
13	71.67	15522.	60	0.	0	190.852	1.085706	.821776	-.23
14	63.33	15293.	62	0.	0	190.852	1.068954	.808270	-.22
15	55.00	15057.	65	0.	0	190.852	1.051833	.794898	-.24
16	46.67	14913.	67	0.	0	190.852	1.036320	.781559	-.28
17	38.33	16846.	69	0.	0	190.852	1.022926	.768044	-.29
18	30.00	17402.	72	0.	0	160.025	1.009299	.754343	-.29
19	21.67	17045.	74	0.	0	160.025	.992353	.737814	-.33
20	13.33	18139.	76	0.	0	160.025	.974428	.721218	-.39
21	5.00	18403.	79	0.	0	160.025	.955209	.704775	-.45
22	-3.33	18530.	81	0.	0	160.025	.934455	.688485	-.52
23	-11.67	18491.	83	0.	0	160.025	.911746	.672200	-.59
24	-20.00	18568.	85	0.	0	160.025	.887011	.655861	-.63
25	-28.33	18356.	88	0.	0	160.025	.860281	.639239	-.69
26	-36.67	18182.	90	0.	0	160.025	.831946	.622072	-.72
27	-45.00	17438.	92	0.	0	160.025	.802138	.604076	-.72
28	-53.33	17232.	95	0.	0	160.025	.771140	.584935	-.73
29	-61.67	16453.	97	0.	0	160.025	.738205	.564509	-.66
30	-70.00	20402.	100	0.	0	128.806	.703259	.542789	-.62
31	-78.89	19535.	102	0.	0	128.806	.655733	.512361	-.57
32	-87.78	18671.	104	0.	0	128.806	.609163	.480534	-.51
33	-96.67	17834.	109	0.	0	128.806	.562795	.447501	-.45
34	-105.56	17327.	110	0.	0	128.806	.514956	.413436	-.37
35	-114.44	16337.	111	0.	0	128.806	.466183	.379913	-.31
36	-123.33	15552.	117	0.	0	128.806	.417588	.344292	-.23
37	-132.22	15954.	119	0.	0	128.806	.371373	.310157	-.16
38	-141.11	14377.	123	0.	0	128.806	.329329	.277142	-.11

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.72	50.	101.84	19130.	30	15927.	30
2.45	100.	193.98	19827.	30	13470.	30
3.46	150.	276.46	19965.	30	11163.	30
4.80	200.	350.45	20006.	30	9079.	30
6.16	250.	417.20	20038.	30	7196.	30
7.88	300.	477.52	20068.	30	5452.	30
9.87	350.	532.06	20093.	30	3847.	30
12.25	400.	581.35	20117.	30	2665.	12
14.41	450.	625.89	20137.	30	1845.	5
15.98	500.	666.10	20159.	30	847.	5
17.76	550.	702.46	20186.	30	134.	3
19.77	600.	735.38	20209.	30	0.	38
22.08	650.	765.39	20231.	30	0.	38
24.74	700.	793.04	20252.	30	0.	38
27.84	750.	818.09	20272.	30	0.	38
31.49	800.	840.59	20290.	30	0.	38
35.84	850.	861.13	20306.	30	0.	38
41.08	900.	878.95	20319.	30	0.	38
47.53	950.	893.74	20331.	30	0.	38
55.60	1000.	905.58	20341.	30	0.	38
65.97	1050.	916.96	20350.	30	0.	38
79.66	1100.	933.55	20358.	30	0.	38
98.48	1150.	945.14	20366.	30	0.	38
125.79	1200.	951.63	20377.	30	0.	38
168.54	1250.	953.66	20387.	30	0.	38
243.98	1300.	944.03	20395.	30	0.	38
409.17	1350.	927.18	20402.	30	0.	38

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
125.79	1200.
194.10	1271.
243.98	1300.
284.05	1317.

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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

 PROB
   4       42-IN. DIAMETER PILES  ML=105FT 3-PILE STRUCTURES
           200FT PENETRATION -- VULCAN 560 HAMMER
           QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN.    RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                              1
     NEW HAMMER DATA OPTION                 1
     NEW MATERIAL DATA OPTION               1
     NEW PILE SECTION DATA OPTION           1
     NEW SOIL DATA OPTION                   1
     SPECIFIED BLOW COUNT OPTION            1
     OUTPUT OPTION FOR STRESS               1
     BPF FOR STRESS OUTPUT OPTION                       275.
     ULTIMATE RESISTANCE INCREMENT (TONS)               50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)          300.
     SPECIFIED SEGMENT LENGTH (FT)                      -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION             VULCAN 560 HAMMER
     HAMMER EFFICIENCY                    .75
     HAMMER ENERGY (FT-LBS)         300000.00
     HAMMER EXPLOSIVE FORCE (LBS)       -0.00
     NUMBER OF HAMMER SEGMENTS              2

     SEGMENT     SLACK       WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER     (IN)         (LB)     (SQ IN) RESTITUTION     (LB / IN)

        1       1000.00  60000.00      1.00        .60        6200000.00
        2       1000.00  42000.00      1.00        .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL       (TOD)   UNIT WT.   MODULUS
           TYPE                  (PCF)      (PSI)

            1          42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.250	30.	0	30
2	1	1.500	50.	30	80
3	1	1.500	50.	80	130
4	1	1.250	50.	130	180
5	1	1.250	50.	180	230
6	1	1.000	50.	230	280
7	1	1.000	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	38672769.
3	160.00	0.00	5445.30	160.03	1.00	38672769.
4	150.00	0.00	5445.30	160.03	1.00	38672769.
5	140.00	0.00	5445.30	160.03	1.00	38672769.
6	130.00	0.00	5411.90	190.85	1.00	55347138.
7	121.67	0.00	5411.90	190.85	1.00	55347138.
8	113.33	0.00	5411.90	190.85	1.00	55347138.
9	105.00	0.00	5411.90	190.85	1.00	55347138.
10	96.67	0.00	5411.90	190.85	1.00	55347138.
11	88.33	0.00	5411.90	190.85	1.00	55347138.
12	80.00	0.00	5411.90	190.85	1.00	55347138.
13	71.67	0.00	5411.90	190.85	1.00	55347138.
14	63.33	0.00	5411.90	190.85	1.00	55347138.
15	55.00	0.00	5411.90	190.85	1.00	55347138.
16	46.67	0.00	5411.90	190.85	1.00	55347138.
17	38.33	0.00	5411.90	190.85	1.00	55347138.
18	30.00	0.00	4537.75	160.03	1.00	46407322.
19	21.67	0.00	4537.75	160.03	1.00	46407322.
20	13.33	0.00	4537.75	160.03	1.00	46407322.
21	5.00	0.00	4537.75	160.03	1.00	46407322.
22	-3.33	0.00	4537.75	160.03	1.00	46407322.
23	-11.67	0.00	4537.75	160.03	1.00	46407322.
24	-20.00	0.00	4537.75	160.03	1.00	46407322.
25	-28.33	0.00	4537.75	160.03	1.00	46407322.
26	-36.67	0.00	4537.75	160.03	1.00	46407322.
27	-45.00	0.00	4537.75	160.03	1.00	46407322.
28	-53.33	0.00	4537.75	160.03	1.00	46407322.
29	-61.67	0.00	4537.75	160.03	1.00	46407322.
30	-70.00	0.00	3652.47	128.81	1.00	37353624.
31	-78.33	0.00	3652.47	128.81	1.00	37353624.
32	-86.67	0.00	3652.47	128.81	1.00	37353624.
33	-95.00	0.00	3652.47	128.81	1.00	37353624.
34	-103.33	0.00	3652.47	128.81	1.00	37353624.
35	-111.67	0.00	3652.47	128.81	1.00	37353624.
36	-120.00	0.00	3895.97	128.81	1.00	35019022.
37	-128.89	0.00	3895.97	128.81	1.00	35019022.
38	-137.78	0.00	3895.97	128.81	1.00	35019022.
39	-146.67	0.00	3895.97	128.81	1.00	35019022.
40	-155.56	0.00	3895.97	128.81	1.00	35019022.
41	-164.44	0.00	3895.97	128.81	1.00	35019022.
42	-173.33	0.00	3895.97	128.81	1.00	35019022.
43	-182.22	0.00	3895.97	128.81	1.00	35019022.
44	-191.11	1000.00	3895.97	128.81	1.00	35019022.

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0418 INCHES
NUMBER OF BLOWS PER FOOT = 287.14
TOTAL INTERVALS = 309

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4016784.	25	0.	309	1.000	1.680324	-2.511981	-15.54
2	0.00	2877199.	37	0.	309	1.000	1.253734	.094022	-2.75
3	160.00	18367.	39	438.	226	160.025	1.225151	.240137	-1.79
4	150.00	18689.	42	635.	228	160.025	1.208072	.239938	-1.80
5	140.00	18916.	44	694.	231	160.025	1.189327	.239718	-1.80
6	130.00	15884.	46	639.	233	190.852	1.169106	.239481	-1.84
7	121.67	15908.	49	660.	235	190.852	1.154211	.239478	-1.86
8	113.33	15941.	51	549.	287	190.852	1.139009	.239572	-1.88
9	105.00	15968.	53	591.	287	190.852	1.124069	.239781	-1.89
10	96.67	15972.	55	578.	285	190.852	1.108953	.240061	-1.91
11	88.33	15908.	57	564.	288	190.852	1.093019	.240544	-1.93
12	80.00	15739.	59	543.	292	190.852	1.076419	.241174	-1.92
13	71.67	15516.	61	530.	295	190.852	1.059595	.241865	-1.93
14	63.33	15282.	63	528.	299	190.852	1.044874	.242929	-1.95
15	55.00	15073.	66	545.	302	190.852	1.031640	.244277	-1.95
16	46.67	14909.	68	607.	304	190.852	1.018206	.245882	-1.96
17	38.33	14857.	71	694.	309	190.852	1.004000	.247847	-1.97
18	30.00	17816.	73	968.	309	160.025	.988654	.250239	-1.96
19	21.67	17984.	76	1082.	309	160.025	.969125	.253579	-1.92
20	13.33	18226.	78	1192.	309	160.025	.948154	.257309	-1.86
21	5.00	18525.	80	1330.	309	160.025	.925416	.261419	-1.78
22	-3.33	18800.	83	1427.	309	160.025	.900558	.266005	-1.69
23	-11.67	18889.	85	1358.	309	160.025	.873535	.270927	-1.58
24	-20.00	18784.	87	1157.	309	160.025	.844144	.275609	-1.46
25	-28.33	18617.	90	871.	309	160.025	.812447	.279597	-1.34
26	-36.67	18360.	92	507.	309	160.025	.778350	.282601	-1.20
27	-45.00	17934.	95	74.	309	160.025	.741893	.284348	-1.03
28	-53.33	17531.	97	0.	0	160.025	.703336	.284603	-.89
29	-61.67	17176.	100	0.	0	160.025	.663246	.283382	-.80
30	-70.00	20721.	102	0.	0	128.806	.622207	.280347	-.70
31	-78.33	19998.	105	0.	0	128.806	.571317	.273910	-.57
32	-86.67	19189.	107	0.	0	128.806	.521151	.264685	-.49
33	-95.00	18243.	110	0.	0	128.806	.472146	.252508	-.42
34	-103.33	17211.	113	0.	0	128.806	.424318	.236962	-.32
35	-111.67	16029.	115	0.	0	128.806	.377879	.218029	-.21
36	-120.00	14860.	116	0.	0	128.806	.332983	.196503	-.11
37	-128.89	13798.	119	0.	0	128.806	.285747	.171953	-.08
38	-137.78	12879.	122	0.	0	128.806	.240671	.147322	-.13

39	[illegible]	11790.	125	0.	0	[illegible].806	.198686	.123865	-.21
40	-15[illegible]	10403.	126	0.	0	[illegible]306	.161589	.102423	-.25
41	-164[illegible]	8631.	129	0.	0	[illegible]306	.129506	.083641	-.25
42	-173.33	7068.	129	0.	0	128.806	.103687	.068223	-.22
43	-182.22	5520.	131	0.	0	128.806	.083253	.056852	-.17
44	-191.11	4499.	131	0.	0	128.806	.066791	.049413	-.10

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN. PU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.87	50.	28.76	18980.	31	16203.	32
2.73	100.	55.07	19693.	30	14083.	32
3.67	150.	78.98	20027.	30	12159.	33
4.49	200.	100.56	20084.	30	10393.	33
5.30	250.	120.12	20127.	30	8850.	34
6.44	300.	137.86	20165.	30	7439.	35
9.23	350.	153.95	20199.	30	6231.	36
10.19	400.	168.50	20231.	30	5121.	36
11.08	450.	181.66	20266.	30	4090.	36
12.05	500.	193.56	20302.	30	3125.	36
13.10	550.	204.28	20336.	30	2334.	4
14.27	600.	213.94	20367.	30	1540.	4
15.55	650.	222.61	20397.	30	959.	3
16.98	700.	230.35	20425.	30	64.	38
18.57	750.	237.25	20451.	30	0.	44
20.35	800.	243.35	20476.	30	0.	44
22.35	850.	248.66	20498.	30	0.	44
24.62	900.	253.27	20518.	30	0.	44
27.20	950.	257.14	20537.	30	0.	44
30.15	1000.	260.51	20556.	30	0.	44
33.55	1050.	263.31	20573.	30	0.	44
37.50	1100.	265.54	20591.	30	0.	44
42.12	1150.	267.36	20610.	30	0.	44
47.59	1200.	268.87	20627.	30	0.	44
54.08	1250.	270.04	20643.	30	0.	44
61.89	1300.	270.68	20657.	30	0.	44
71.40	1350.	270.46	20670.	30	0.	44
83.08	1400.	269.46	20683.	30	0.	44
97.56	1450.	269.99	20693.	30	0.	44
115.76	1500.	273.61	20701.	30	641.	21
138.46	1550.	277.50	20707.	30	761.	21
165.69	1600.	281.58	20712.	30	873.	21
197.70	1650.	284.56	20716.	30	1088.	22
236.80	1700.	287.22	20719.	30	1208.	22
287.14	1750.	289.73	20721.	30	1427.	22
354.41	1800.	292.05	20721.	30	2977.	21

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.00 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
138.46	1550.
197.70	1650.
236.80	1700.
287.14	1750.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

 PROB
   5      42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
          200FT PENETRATION -- VULCAN 560 HAMMER
          QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN.   RU = 35


TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                              1
     NEW HAMMER DATA OPTION                 1
     NEW MATERIAL DATA OPTION               1
     NEW PILE SECTION DATA OPTION           1
     NEW SOIL DATA OPTION                   1
     SPECIFIED BLOW COUNT OPTION            1
     OUTPUT OPTION FOR STRESS               1
     BPF FOR STRESS OUTPUT OPTION                      275.
     ULTIMATE RESISTANCE INCREMENT (TONS)              50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)         300.
     SPECIFIED SEGMENT LENGTH (FT)                     -0.00


TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION          VULCAN 560 HAMMER
     HAMMER EFFICIENCY                  .75
     HAMMER ENERGY (FT-LBS)       300000.00
     HAMMER EXPLOSIVE FORCE (LBS)     -0.00
     NUMBER OF HAMMER SEGMENTS            2

     SEGMENT     SLACK       WEIGHT      AREA    COEF OF    SPRING CONSTANT
      NUMBER     (IN)         (LB)     (SQ IN) RESTITUTION    (LB / IN)

        1        1000.00  60000.00      1.00       .60       6200000.00
        2        1000.00  42000.00      1.00       .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

             1        42.000    490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS     7
```

```
NUMBER OF SECTIONS CHANGED          0
NUMBER OF SECTIONS ADDED            0
LENGTH OF FREE STANDING PILE(FT)    160.00
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.250	30.	0	30
2	1	1.500	50.	30	80
3	1	1.500	50.	80	130
4	1	1.250	50.	130	180
5	1	1.250	50.	180	230
6	1	1.000	50.	230	280
7	1	1.000	80.	280	360

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES     1
SIDE DAMPENING RESISTANCE  = JSIDE      .15
POINT DAMPENING RESISTANCE = JPONT      .15
SOIL QUAKE FOR SIDE        = QSIDE      .10
SOIL QUAKE FOR POINT       = QPOINT     .10
```

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	38672769.
3	160.00	0.00	5445.30	160.03	1.00	38672769.
4	150.00	0.00	5445.30	160.03	1.00	38672769.
5	140.00	0.00	5445.30	160.03	1.00	38672769.
6	130.00	0.00	5411.90	190.85	1.00	55347138.
7	121.67	0.00	5411.90	190.85	1.00	55347138.
8	113.33	0.00	5411.90	190.85	1.00	55347138.
9	105.00	0.00	5411.90	190.85	1.00	55347138.
10	96.67	0.00	5411.90	190.85	1.00	55347138.
11	88.33	0.00	5411.90	190.85	1.00	55347138.
12	80.00	0.00	5411.90	190.85	1.00	55347138.
13	71.67	0.00	5411.90	190.85	1.00	55347138.
14	63.33	0.00	5411.90	190.85	1.00	55347138.
15	55.00	0.00	5411.90	190.85	1.00	55347138.
16	46.67	0.00	5411.90	190.85	1.00	55347138.
17	38.33	0.00	5411.90	190.85	1.00	55347138.
18	30.00	0.00	4537.75	160.03	1.00	46407322.
19	21.67	0.00	4537.75	160.03	1.00	46407322.
20	13.33	0.00	4537.75	160.03	1.00	46407322.
21	5.00	0.00	4537.75	160.03	1.00	46407322.
22	-3.33	0.00	4537.75	160.03	1.00	46407322.
23	-11.67	0.00	4537.75	160.03	1.00	46407322.
24	-20.00	0.00	4537.75	160.03	1.00	46407322.
25	-28.33	0.00	4537.75	160.03	1.00	46407322.
26	-36.67	0.00	4537.75	160.03	1.00	46407322.
27	-45.00	0.00	4537.75	160.03	1.00	46407322.
28	-53.33	0.00	4537.75	160.03	1.00	46407322.
29	-61.67	0.00	4537.75	160.03	1.00	46407322.
30	-70.00	0.00	3652.47	128.81	1.00	37353624.
31	-78.33	0.00	3652.47	128.81	1.00	37353624.
32	-66.67	0.00	3652.47	128.81	1.00	37353624.
33	-95.00	0.00	3652.47	128.81	1.00	37353624.
34	-103.33	0.00	3652.47	128.81	1.00	37353624.
35	-111.67	0.00	3652.47	128.81	1.00	37353624.
36	-120.00	0.00	3895.97	128.81	1.00	35019022.
37	-128.89	0.00	3895.97	128.81	1.00	35019022.
38	-137.78	0.00	3895.97	128.81	1.00	35019022.
39	-146.67	0.00	3895.97	128.81	1.00	35019022.
40	-155.56	0.00	3895.97	128.81	1.00	35019022.
41	-164.44	0.00	3895.97	128.81	1.00	35019022.
42	-173.33	0.00	3895.97	128.81	1.00	35019022.
43	-182.22	0.00	3895.97	128.81	1.00	35019022.
44	-191.11	1000.00	3895.97	128.81	1.00	35019022.

PROB 5 42-IN. DIAMETER PILES MLW=105FT 5-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN. RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0354 INCHES
NUMBER OF BLOWS PER FOOT = 338.93
TOTAL INTERVALS = 204

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4016784.	25	0.	130	1.000	1.710154	1.602940	-2.69
2	0.00	2877199.	37	0.	0	1.000	1.279971	1.108674	-2.45
3	160.00	18367.	39	0.	0	160.025	1.255194	1.068664	-2.37
4	150.00	18689.	42	0.	0	160.025	1.242514	1.041909	-2.25
5	140.00	18916.	44	0.	0	160.025	1.228728	1.014356	-2.10
6	130.00	15884.	46	0.	0	190.852	1.213628	.986106	-1.88
7	121.67	15908.	49	0.	0	190.852	1.201943	.966338	-1.70
8	113.33	15941.	51	0.	0	190.852	1.189183	.946766	-1.50
9	105.00	15968.	53	0.	0	190.852	1.175324	.927505	-1.31
10	96.67	15972.	55	0.	0	190.852	1.160538	.908533	-1.15
11	88.33	15908.	57	0.	0	190.852	1.145131	.889783	-1.03
12	80.00	15739.	59	0.	0	190.852	1.129665	.871305	-.90
13	71.67	15516.	61	0.	0	190.852	1.114363	.853326	-.77
14	63.33	15282.	63	0.	0	190.852	1.098396	.836165	-.61
15	55.00	15073.	66	0.	0	190.852	1.081626	.820183	-.46
16	46.67	14907.	68	0.	0	190.852	1.064342	.805525	-.39
17	38.33	14847.	71	0.	0	190.852	1.047879	.791893	-.39
18	30.00	17782.	73	0.	0	160.025	1.033741	.778886	-.42
19	21.67	17896.	76	0.	0	160.025	1.017739	.763846	-.45
20	13.33	18073.	78	0.	0	160.025	1.001313	.749494	-.42
21	5.00	18287.	80	0.	0	160.025	.983882	.735960	-.41
22	-3.33	18458.	82	0.	0	160.025	.965137	.722807	-.41
23	-11.67	18489.	85	0.	0	160.025	.944515	.709631	-.39
24	-20.00	18357.	87	0.	0	160.025	.921710	.696125	-.38
25	-28.33	18146.	89	0.	0	160.025	.896722	.681909	-.38
26	-36.67	17883.	91	0.	0	160.025	.869304	.666520	-.39
27	-45.00	17522.	94	0.	0	160.025	.839762	.649698	-.38
28	-53.33	17194.	97	0.	0	160.025	.808194	.631332	-.38
29	-61.67	16950.	99	0.	0	160.025	.774971	.611160	-.38
30	-70.00	20673.	102	0.	0	128.806	.740299	.589180	-.35
31	-78.33	20208.	104	0.	0	128.806	.696923	.559959	-.34
32	-86.67	19664.	106	0.	0	128.806	.653372	.529010	-.32
33	-95.00	19027.	109	0.	0	128.806	.610339	.496547	-.31
34	-103.33	18346.	111	0.	0	128.806	.567551	.462778	-.28
35	-111.67	17543.	114	0.	0	128.806	.525064	.428109	-.27
36	-120.00	16726.	116	0.	0	128.806	.482199	.392721	-.25
37	-128.89	15881.	118	0.	0	128.806	.435502	.354488	-.21
38	-137.78	15098.	123	0.	0	128.806	.388553	[illegible]	[illegible]

39	-14[illegible]	14695.	126	0.	0	[illegible].806	.342507	.278590	-.22
40	-15[illegible]	14176.	125	0.	0	[illegible].806	.297512	.242011	-.23
41	-164.44	13334.	128	0.	0	1[illegible].806	.253012	.206838	-.23
42	-173.33	12628.	132	0.	0	128.806	.208688	.173704	-.21
43	-182.22	12023.	133	0.	0	128.806	.169786	.143016	-.17
44	-191.11	10304.	135	0.	0	128.806	.135405	.115294	-.12

PROB 5 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,100,MINIMUM WALL THICKNESS=1,00 IN, RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35,00

BLOWS/FT,	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1,72	50,	71,61	19020,	32	15990,	30
2,62	100,	136,78	19777,	30	13602,	32
3,66	150,	195,53	20069,	30	11471,	33
4,58	200,	248,26	20109,	30	9537,	33
5,52	250,	295,88	20143,	30	7818,	18
6,88	300,	338,92	20173,	30	6369,	18
8,36	350,	377,83	20201,	30	5015,	18
10,91	400,	412,97	20228,	30	3941,	5
11,97	450,	444,69	20253,	30	2890,	5
13,12	500,	473,51	20276,	30	1839,	4
14,39	550,	499,15	20300,	30	1090,	4
15,81	600,	522,39	20328,	30	503,	3
17,39	650,	543,31	20355,	30	78,	3
19,17	700,	562,07	20381,	30	0,	44
21,19	750,	578,87	20405,	30	0,	44
23,49	800,	593,87	20428,	30	0,	44
26,12	850,	607,25	20450,	30	0,	44
29,17	900,	619,15	20472,	30	0,	44
32,72	950,	629,66	20493,	30	0,	44
36,90	1000,	638,81	20511,	30	0,	44
41,85	1050,	646,57	20529,	30	0,	44
47,79	1100,	652,85	20546,	30	0,	44
55,03	1150,	657,71	20562,	30	0,	44
63,98	1200,	661,65	20578,	30	0,	44
75,27	1250,	664,56	20593,	30	0,	44
89,86	1300,	666,68	20607,	30	0,	44
109,21	1350,	668,29	20621,	30	0,	44
135,96	1400,	669,58	20633,	30	0,	44
174,75	1525 1450,	669,92	20645,	30	0,	44
234,95	1500,	668,05	20660,	30	0,	44
338,93	1550,	663,64	20673,	30	0,	44

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.00 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
135.96	1400.
196.31	1471.
234.95	1500.
292.01	1531.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACHR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
  6       42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
          200FT PENETRATION -- VULCAN 560 HAMMER
          QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN.   RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                               1
     NEW HAMMER DATA OPTION                  1
     NEW MATERIAL DATA OPTION                1
     NEW PILE SECTION DATA OPTION            1
     NEW SOIL DATA OPTION                    1
     SPECIFIED BLOW COUNT OPTION             1
     OUTPUT OPTION FOR STRESS                1
     BPF FOR STRESS OUTPUT OPTION                        275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)           300.
     SPECIFIED SEGMENT LENGTH (FT)                      -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION            VULCAN 560 HAMMER
     HAMMER EFFICIENCY                     .75
     HAMMER ENERGY (FT-LBS)         300000.00
     HAMMER EXPLOSIVE FORCE (LBS)       -0.00
     NUMBER OF HAMMER SEGMENTS              2

     SEGMENT      SLACK       WEIGHT      AREA    COEF OF    SPRING CONSTANT
      NUMBER      (IN)         (LB)     (SQ IN) RESTITUTION    (LB / IN)

        1        1000.00  60000.00      1.00        .60       6200000.00
        2        1000.00  42000.00      1.00        .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL       (TOD)   UNIT WT.   MODULUS
           TYPE                  (PCF)      (PSI)

             1          42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA
```

NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.250	30.	0	30
2	1	1.500	50.	30	80
3	1	1.500	50.	80	130
4	1	1.250	50.	130	180
5	1	1.250	50.	180	230
6	1	1.000	50.	230	280
7	1	1.000	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	38672769.
3	160.00	0.00	5445.30	160.03	1.00	38672769.
4	150.00	0.00	5445.30	160.03	1.00	38672769.
5	140.00	0.00	5445.30	160.03	1.00	38672769.
6	130.00	0.00	5411.90	190.85	1.00	55347138.
7	121.67	0.00	5411.90	190.85	1.00	55347138.
8	113.33	0.00	5411.90	190.85	1.00	55347138.
9	105.00	0.00	5411.90	190.85	1.00	55347138.
10	96.67	0.00	5411.90	190.85	1.00	55347138.
11	88.33	0.00	5411.90	190.85	1.00	55347138.
12	80.00	0.00	5411.90	190.85	1.00	55347138.
13	71.67	0.00	5411.90	190.85	1.00	55347138.
14	63.33	0.00	5411.90	190.85	1.00	55347138.
15	55.00	0.00	5411.90	190.85	1.00	55347138.
16	46.67	0.00	5411.90	190.85	1.00	55347138.
17	38.33	0.00	5411.90	190.85	1.00	55347138.
18	30.00	0.00	4537.75	160.03	1.00	46407322.
19	21.67	0.00	4537.75	160.03	1.00	46407322.
20	13.33	0.00	4537.75	160.03	1.00	46407322.
21	5.00	0.00	4537.75	160.03	1.00	46407322.
22	-3.33	0.00	4537.75	160.03	1.00	46407322.
23	-11.67	0.00	4537.75	160.03	1.00	46407322.
24	-20.00	0.00	4537.75	160.03	1.00	46407322.
25	-28.33	0.00	4537.75	160.03	1.00	46407322.
26	-36.67	0.00	4537.75	160.03	1.00	46407322.
27	-45.00	0.00	4537.75	160.03	1.00	46407322.
28	-53.33	0.00	4537.75	160.03	1.00	46407322.
29	-61.67	0.00	4537.75	160.03	1.00	46407322.
30	-70.00	0.00	3652.47	128.81	1.00	37353624.
31	-78.33	0.00	3652.47	128.81	1.00	37353624.
32	-86.67	0.00	3652.47	128.81	1.00	37353624.
33	-95.00	0.00	3652.47	128.81	1.00	37353624.
34	-103.33	0.00	3652.47	128.81	1.00	37353624.
35	-111.67	0.00	3652.47	128.81	1.00	37353624.
36	-120.00	0.00	3895.97	128.81	1.00	35019022.
37	-128.89	0.00	3895.97	128.81	1.00	35019022.
38	-137.78	0.00	3895.97	128.81	1.00	35019022.
39	-146.67	0.00	3895.97	128.81	1.00	35019022.
40	-155.56	0.00	3895.97	128.81	1.00	35019022.
41	-164.44	0.00	3895.97	128.81	1.00	35019022.
42	-173.33	0.00	3895.97	128.81	1.00	35019022.
43	-182.22	0.00	3895.97	128.81	1.00	35019022.
44	-191.11	1000.00	3895.97	128.81	1.00	35019022.

PROB 6 42-IN. DIAMETER PILES MLW=10SFT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

.TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0371 INCHES
NUMBER OF BLOWS PER FOOT = 323.09
TOTAL INTERVALS = 224

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4016784.	25	0.	131	1.000	1.754217	1.601333	-2.81
2	0.00	2877199.	37	0.	0	1.000	1.327896	1.142268	-2.28
3	160.00	18367.	39	0.	0	160.025	1.301090	1.107755	-2.21
4	150.00	18689.	42	0.	0	160.025	1.291948	1.086543	-2.11
5	140.00	18916.	44	0.	0	160.025	1.282616	1.063684	-1.99
6	130.00	15884.	46	0.	0	190.852	1.272418	1.040611	-1.83
7	121.67	15908.	49	0.	0	190.852	1.264293	1.025330	-1.68
8	113.33	15941.	51	0.	0	190.852	1.254882	1.011107	-1.53
9	105.00	15968.	53	0.	0	190.852	1.244146	.997760	-1.37
10	96.67	15972.	55	0.	0	190.852	1.231995	.984965	-1.19
11	88.33	15908.	57	0.	0	190.852	1.218564	.972513	-1.03
12	80.00	15739.	59	0.	0	190.852	1.204004	.960209	-.88
13	71.67	15516.	61	0.	0	190.852	1.188599	.947846	-.71
14	63.33	15282.	63	0.	0	190.852	1.172816	.935396	-.53
15	55.00	15073.	66	0.	0	190.852	1.157243	.923002	-.35
16	46.67	14906.	68	0.	0	190.852	1.141284	.910674	-.23
17	38.33	14839.	71	0.	0	190.852	1.124511	.898159	-.14
18	30.00	17757.	73	0.	0	160.025	1.107025	.885407	-.06
19	21.67	17836.	75	0.	0	160.025	1.086736	.870090	.02
20	13.33	17961.	78	0.	0	160.025	1.069420	.854635	.06
21	5.00	18112.	80	0.	0	160.025	1.053733	.838923	.07
22	-3.33	18223.	82	0.	0	160.025	1.037970	.823019	.09
23	-11.67	18210.	84	0.	0	160.025	1.021282	.807037	.05
24	-20.00	18036.	86	0.	0	160.025	1.003442	.790874	-.02
25	-28.33	17796.	89	0.	0	160.025	.983951	.774561	-.09
26	-36.67	17531.	91	0.	0	160.025	.962521	.758098	-.17
27	-45.00	17181.	93	0.	0	160.025	.939414	.741264	-.25
28	-53.33	16913.	96	0.	0	160.025	.914704	.724006	-.32
29	-61.67	16725.	99	0.	0	160.025	.888433	.706313	-.40
30	-70.00	20551.	101	0.	0	128.806	.860802	.688070	-.45
31	-78.33	20252.	103	0.	0	128.806	.826023	.664636	-.50
32	-86.67	19915.	106	0.	0	128.806	.791442	.640430	-.54
33	-95.00	19508.	108	0.	0	128.806	.757923	.615425	-.57
34	-103.33	19053.	110	0.	0	128.806	.725409	.589636	-.57
35	-111.67	18523.	113	0.	0	128.806	.692350	.563091	-.57
36	-120.00	17972.	115	0.	0	128.806	.657830	.535741	-.55
37	-128.89	17261.	117	0.	0	128.806	.619977	.505780	-.52

39	-146,67	15568.	123	0.	0	128,806	,544125	[illegible]	[illegible]
40	-15[illegible]	15343.	126	0.	0	[illegible]806	,503676	,411842	-,37
41	-1[illegible]	14785.	127	0.	0	[illegible],806	,461127	,379668	-,30
42	-17[illegible],33	14353.	133	0.	0	[illegible]8,806	,417763	,347454	-,23
43	-182,22	14417.	134	0.	0	128,806	,375883	,315642	-,18
44	-191,11	14229.	136	0.	0	128,806	,337142	,284533	-,11

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLO-S/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.56	50.	102.01	19053.	32	15848.	30
2.36	100.	194.45	19804.	30	13260.	32
3.49	150.	277.46	20094.	30	10969.	32
4.62	200.	351.70	20126.	30	9019.	19
5.83	250.	418.52	20152.	30	7268.	19
7.57	300.	478.82	20177.	30	5748.	18
9.46	350.	533.27	20199.	30	4399.	18
11.73	400.	582.36	20222.	30	3158.	18
14.01	450.	626.58	20242.	30	2400.	5
15.61	500.	666.35	20262.	30	1638.	5
17.43	550.	702.04	20281.	30	528.	5
19.50	600.	734.17	20301.	30	0.	44
21.88	650.	763.34	20319.	30	0.	44
24.65	700.	789.89	20336.	30	0.	44
27.90	750.	813.98	20358.	30	0.	44
31.76	800.	835.43	20378.	30	0.	44
36.41	850.	854.32	20398.	30	0.	44
42.09	900.	871.18	20418.	30	0.	44
49.18	950.	885.02	20437.	30	0.	44
58.22	1000.	895.67	20455.	30	0.	44
70.05	1050.	904.03	20473.	30	0.	44
86.11	1100.	919.52	20490.	30	0.	44
109.03	1150.	931.04	20506.	30	0.	44
143.99	1200.	937.59	20522.	30	0.	44
203.20	1250.	934.05	20537.	30	0.	44
323.09	1300.	916.37	20551.	30	0.	44

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.00 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
143.99	1200.
203.20	1250.
238.65	1270.
323.09	1300.

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	- 1.25 in.
Penetration	- 150 ft.
	- 200 ft.
Hammer	- Vulcan 560
Quake Factor, tip	- .025 in.
	- .10 in.
	- .30 in.

2

6000 REMOTE BATCH

UNITED COMPUTING 67, APEX/SL 8.4.1

14.13.08. 06/09/76.

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JJJJJJJJJJJJ  YY        YY  JJJJJJJJJJJJ       111       PPPPPPPPPPP      000000  0  IIIIIIIIIIII
JJJJJJJJJJJJ  YY        YY  JJJJJJJJJJJJ      1111       PPPPPPPPPPPP    000000000   IIIIIIIIIIII
      JJ      YY        YY        JJ         1 11        PP        PP  00        00       II
      JJ      YY        YY        JJ           11        PP        PP  00       0 00      II
      JJ      YY        YY        JJ           11        PP        PP  00      0  00      II
      JJ      YY        YY        JJ           11        PP        PP  00     0   00      II
      JJ      YYY      YYY        JJ           11        PPPPPPPPPPPP  00    0    00      II
      JJ       YYY    YYY         JJ           11        PPPPPPPPPPP   00   0     00      II
      JJ        YYY  YYY          JJ           11        PP            00   0     00      II
      JJ          YYYY            JJ           11        PP            00  0      00      II
      JJ           YY             JJ           11        PP            00 0       00      II
      JJ           YY             JJ           11        PP            00 0       00      II
      JJ           YY             JJ           11        PP            00 0       00      II
JJ    JJ           YY       JJ    JJ           11        PP            000       00       II
JJJJJJJJ           YY       JJJJJJJJ     111111111111    PP             000000000     IIIIIIIIIIII
 JJJJJ             YY        JJJJJ       111111111111    PP            0  000000      IIIIIIIIIIII
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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1	
NEW HAMMER DATA OPTION	1	
NEW MATERIAL DATA OPTION	1	
NEW PILE SECTION DATA OPTION	1	
NEW SOIL DATA OPTION	1	
SPECIFIED BLOW COUNT OPTION	1	
OUTPUT OPTION FOR STRESS	1	
BPF FOR STRESS OUTPUT OPTION		275.
ULTIMATE RESISTANCE INCREMENT (TONS)		50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)		300.
SPECIFIED SEGMENT LENGTH (FT)		-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	6
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .03

TIP RESISTANCE PERCENTAGE
10.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,025,MINIMUM WALL THICKNESS=1,25 IN, RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN,	WEIGHT LBS	AREA SQ,IN,	COEF RSTITU	SPR STIFF LBS/IN,
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	46122615,
3	160,00	0,00	6494,28	190,85	1,00	46122615,
4	150,00	0,00	6494,28	190,85	1,00	46122615,
5	140,00	0,00	6494,28	190,85	1,00	46122615,
6	130,00	0,00	6274,91	221,29	1,00	64173070,
7	121,67	0,00	6274,91	221,29	1,00	64173070,
8	113,33	0,00	6274,91	221,29	1,00	64173070,
9	105,00	0,00	6274,91	221,29	1,00	64173070,
10	96,67	0,00	6274,91	221,29	1,00	64173070,
11	88,33	0,00	6274,91	221,29	1,00	64173070,
12	80,00	0,00	6274,91	221,29	1,00	64173070,
13	71,67	0,00	6274,91	221,29	1,00	64173070,
14	63,33	0,00	6274,91	221,29	1,00	64173070,
15	55,00	0,00	6274,91	221,29	1,00	64173070,
16	46,67	0,00	6274,91	221,29	1,00	64173070,
17	38,33	0,00	6274,91	221,29	1,00	64173070,
18	30,00	0,00	5411,90	190,85	1,00	55347138,
19	21,67	0,00	5411,90	190,85	1,00	55347138,
20	13,33	0,00	5411,90	190,85	1,00	55347138,
21	5,00	0,00	5411,90	190,85	1,00	55347138,
22	-3,33	0,00	5411,90	190,85	1,00	55347138,
23	-11,67	0,00	5411,90	190,85	1,00	55347138,
24	-20,00	0,00	5411,90	190,85	1,00	55347138,
25	-28,33	0,00	5411,90	190,85	1,00	55347138,
26	-36,67	0,00	5411,90	190,85	1,00	55347138,
27	-45,00	0,00	5411,90	190,85	1,00	55347138,
28	-53,33	0,00	5411,90	190,85	1,00	55347138,
29	-61,67	0,00	5411,90	190,85	1,00	55347138,
30	-70,00	0,00	4840,27	160,03	1,00	43506865,
31	-78,89	0,00	4840,27	160,03	1,00	43506865,
32	-87,78	0,00	4840,27	160,03	1,00	43506865,
33	-96,67	0,00	4840,27	160,03	1,00	43506865,
34	-105,56	0,00	4840,27	160,03	1,00	43506865,
35	-114,44	0,00	4840,27	160,03	1,00	43506865,
36	-123,33	0,00	4840,27	160,03	1,00	43506865,
37	-132,22	0,00	4840,27	160,03	1,00	43506865,
38	-141,11	1000,00	4840,27	160,03	1,00	43506865,

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0411 INCHES
NUMBER OF BLOWS PER FOOT = 291.66
TOTAL INTERVALS = 258

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4071754.	25	0.	258	1.000	1.493298	-1.714340	-15.54
2	0.00	3158208.	35	0.	258	1.000	1.065190	.024182	-2.85
3	160.00	16846.	37	508.	200	190.852	1.036815	.185231	-1.69
4	150.00	17112.	40	930.	203	190.852	1.019822	.185450	-1.68
5	140.00	17291.	42	1162.	205	190.852	1.003267	.185771	-1.68
6	130.00	14934.	44	938.	206	221.286	.987773	.186561	-1.69
7	121.67	14966.	47	712.	208	221.286	.976101	.187266	-1.64
8	113.33	14997.	49	506.	211	221.286	.963769	.188420	-1.64
9	105.00	15024.	51	546.	258	221.286	.951539	.189868	-1.62
10	96.67	15034.	53	606.	258	221.286	.940688	.191751	-1.63
11	88.33	14988.	55	700.	255	221.286	.931509	.193842	-1.62
12	80.00	14855.	57	801.	258	221.286	.922778	.196152	-1.60
13	71.67	14682.	59	834.	258	221.286	.913692	.198915	-1.63
14	63.33	14505.	61	821.	258	221.286	.903621	.201791	-1.57
15	55.00	14335.	63	855.	258	221.286	.891915	.204621	-1.54
16	46.67	14229.	66	854.	258	221.286	.877903	.207569	-1.53
17	38.33	14215.	68	766.	258	221.286	.861310	.210515	-1.48
18	30.00	16644.	71	999.	234	190.852	.841998	.213154	-1.40
19	21.67	16921.	73	1091.	236	190.852	.816779	.215956	-1.31
20	13.33	17333.	76	1170.	238	190.852	.788451	.218365	-1.20
21	5.00	17861.	78	1255.	241	190.852	.756762	.220341	-1.09
22	-3.33	18328.	81	1260.	243	190.852	.721871	.222058	-1.02
23	-11.67	18561.	83	1087.	245	190.852	.684479	.223590	-1.02
24	-20.00	18562.	85	744.	247	190.852	.645099	.224810	-1.05
25	-28.33	18417.	88	234.	249	190.852	.603926	.225146	-1.04
26	-36.67	18086.	90	0.	0	190.852	.561640	.223947	-1.02
27	-45.00	17428.	92	0.	0	190.852	.518166	.221016	-1.05
28	-53.33	16738.	95	0.	0	190.852	.474104	.216324	-1.15
29	-61.67	15958.	98	0.	0	190.852	.429372	.209313	-1.21
30	-70.00	17850.	101	0.	0	160.025	.384571	.199053	-1.15
31	-78.89	16561.	104	0.	0	160.025	.328181	.181162	-.99
32	-87.78	15314.	106	0.	0	160.025	.273650	.159683	-.82
33	-96.67	13988.	107	0.	0	160.025	.222905	.136349	-.66
34	-105.56	12161.	108	0.	0	160.025	.177835	.112882	-.51
35	-114.44	9994.	111	0.	0	160.025	.139182	.090969	-.37
36	-123.33	7746.	112	0.	0	160.025	.108190	.072277	-.26
37	-132.22	5801.	114	0.	0	160.025	.084162	.058334	-.17
38	-141.11	4436.	112	0.	0	160.025	.066143	.049463	-.10

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.95	50.	27.00	17280.	5	15678.	30
2.71	100.	52.04	17752.	30	14077.	30
3.64	150.	75.21	18017.	30	12583.	30
4.66	200.	96.53	18088.	30	11167.	30
5.69	250.	116.21	18132.	30	9853.	30
6.63	300.	134.40	18168.	30	8627.	30
7.70	350.	151.22	18197.	30	7480.	30
8.90	400.	166.78	18222.	30	6402.	30
10.22	450.	181.16	18242.	30	5392.	30
12.17	500.	194.46	18261.	30	4440.	30
13.01	550.	206.75	18274.	30	3549.	31
13.92	600.	218.12	18284.	30	2753.	31
14.90	650.	228.61	18299.	30	1998.	31
15.96	700.	238.31	18316.	30	1280.	31
17.10	750.	247.25	18327.	30	603.	32
18.34	800.	255.49	18335.	30	1.	32
19.69	850.	263.07	18343.	30	0.	38
21.17	900.	270.01	18347.	30	0.	38
22.77	950.	276.56	18347.	30	0.	38
24.54	1000.	282.12	18345.	30	0.	38
26.49	1050.	287.35	18339.	30	0.	38
28.64	1100.	292.12	18334.	30	0.	38
31.02	1150.	296.46	18333.	30	0.	38
33.67	1200.	300.34	18330.	30	0.	38
36.65	1250.	303.75	18325.	30	0.	38
39.97	1300.	306.74	18315.	30	0.	38
43.74	1350.	309.38	18301.	30	0.	38
47.99	1400.	311.78	18286.	30	0.	38
52.85	1450.	313.92	18268.	30	0.	38
58.41	1500.	315.75	18249.	30	0.	38
64.80	1550.	317.02	18226.	30	957.	21
72.26	1600.	317.62	18206.	30	990.	21
80.86	1650.	317.64	18187.	30	1025.	21
91.03	1700.	317.27	18166.	30	1064.	21
102.89	1750.	319.57	18187.	23	1106.	21
116.93	1800.	324.14	18233.	23	1146.	21
135.46	1850.	329.03	18279.	23	1185.	21
152.28	1900.	334.00	18327.	23	1209.	21
172.66	1950.	338.96	18374.	23	1214.	21
196.32	2000.	343.93	18421.	23	1232.	21
222.77	2050.	347.96	18468.	23	1245.	21
253.81	2100.	351.57	18515.	23	1262.	22
291.66	2150.	354.98	18562.	24	1260.	22
337.02	2200.	358.40	18609.	24	1269.	21

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 10.00

BLOWS PER FOOT	RESISTANCE TONS
133.46	1850.
196.32	2000.
253.81	2100.
291.66	2150.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB 2

42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(YUD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 6
NUMBER OF SECTIONS CHANGED 0
NUMBER OF SECTIONS ADDED 6

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	46122615.
3	160.00	0.00	6494.28	190.85	1.00	46122615.
4	150.00	0.00	6494.28	190.85	1.00	46122615.
5	140.00	0.00	6494.28	190.85	1.00	46122615.
6	130.00	0.00	6274.91	221.29	1.00	64173070.
7	121.67	0.00	6274.91	221.29	1.00	64173070.
8	113.33	0.00	6274.91	221.29	1.00	64173070.
9	105.00	0.00	6274.91	221.29	1.00	64173070.
10	96.67	0.00	6274.91	221.29	1.00	64173070.
11	88.33	0.00	6274.91	221.29	1.00	64173070.
12	80.00	0.00	6274.91	221.29	1.00	64173070.
13	71.67	0.00	6274.91	221.29	1.00	64173070.
14	63.33	0.00	6274.91	221.29	1.00	64173070.
15	55.00	0.00	6274.91	221.29	1.00	64173070.
16	46.67	0.00	6274.91	221.29	1.00	64173070.
17	38.33	0.00	6274.91	221.29	1.00	64173070.
18	30.00	0.00	5411.90	190.85	1.00	55347138.
19	21.67	0.00	5411.90	190.85	1.00	55347138.
20	13.33	0.00	5411.90	190.85	1.00	55347138.
21	5.00	0.00	5411.90	190.85	1.00	55347138.
22	-3.33	0.00	5411.90	190.85	1.00	55347138.
23	-11.67	0.00	5411.90	190.85	1.00	55347138.
24	-20.00	0.00	5411.90	190.85	1.00	55347138.
25	-28.33	0.00	5411.90	190.85	1.00	55347138.
26	-36.67	0.00	5411.90	190.85	1.00	55347138.
27	-45.00	0.00	5411.90	190.85	1.00	55347138.
28	-53.33	0.00	5411.90	190.85	1.00	55347138.
29	-61.67	0.00	5411.90	190.85	1.00	55347138.
30	-70.00	0.00	4840.27	160.03	1.00	43506865.
31	-78.89	0.00	4840.27	160.03	1.00	43506865.
32	-87.78	0.00	4840.27	160.03	1.00	43506865.
33	-96.67	0.00	4840.27	160.03	1.00	43506865.
34	-105.56	0.00	4840.27	160.03	1.00	43506865.
35	-114.44	0.00	4840.27	160.03	1.00	43506865.
36	-123.33	0.00	4840.27	160.03	1.00	43506865.
37	-132.22	0.00	4840.27	160.03	1.00	43506865.
38	-141.11	1000.00	4840.27	160.03	1.00	43506865.

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100, MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0328 INCHES
NUMBER OF BLOWS PER FOOT = 365.33
TOTAL INTERVALS = 261

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4071754.	25	0.	261	1.000	1.512459	-1.396826	-15.54
2	0.00	3158208.	35	0.	261	1.000	1.083127	.133386	-2.87
3	160.00	16846.	37	518.	212	190.852	1.057236	.291904	-1.87
4	150.00	17112.	40	1073.	210	190.852	1.042140	.292150	-1.87
5	140.00	17291.	42	1215.	212	190.852	1.026037	.292867	-1.87
6	130.00	14934.	44	976.	214	221.286	1.010121	.293530	-1.84
7	121.67	14966.	47	818.	216	221.286	.999033	.294218	-1.86
8	113.33	14997.	49	661.	218	221.286	.987353	.295163	-1.84
9	105.00	15024.	51	550.	221	221.286	.974936	.296165	-1.79
10	96.67	15034.	53	463.	223	221.286	.962243	.297342	-1.75
11	88.33	14988.	55	486.	261	221.286	.950708	.298920	-1.74
12	80.00	14855.	57	457.	228	221.286	.941273	.300595	-1.68
13	71.67	14682.	59	466.	230	221.286	.932448	.302134	-1.62
14	63.33	14505.	61	505.	232	221.286	.923299	.303659	-1.58
15	55.00	14335.	63	570.	235	221.286	.913267	.305251	-1.53
16	46.67	14225.	66	624.	237	221.286	.901848	.306554	-1.45
17	38.33	14197.	68	675.	239	221.286	.888663	.307459	-1.38
18	30.00	16571.	71	871.	241	190.852	.873565	.308174	-1.33
19	21.67	16766.	73	963.	244	190.852	.853991	.308742	-1.27
20	13.33	17035.	75	1049.	246	190.852	.832279	.308953	-1.20
21	5.00	17398.	78	1112.	248	190.852	.808280	.309002	-1.18
22	-3.33	17723.	80	1106.	250	190.852	.782195	.309270	-1.23
23	-11.67	17867.	82	969.	252	190.852	.754024	.309694	-1.28
24	-20.00	17818.	84	707.	254	190.852	.723816	.309772	-1.32
25	-28.33	17685.	87	316.	256	190.852	.691789	.309439	-1.43
26	-36.67	17440.	89	0.	0	190.852	.657938	.308940	-1.60
27	-45.00	16970.	92	0.	0	190.852	.622550	.307973	-1.75
28	-53.33	16513.	94	0.	0	190.852	.585802	.305552	-1.77
29	-61.67	16006.	97	0.	0	190.852	.547750	.300463	-1.66
30	-70.00	18356.	99	0.	0	160.025	.508281	.291661	-1.45
31	-78.89	17459.	102	0.	0	160.025	.456705	.275321	-1.15
32	-87.78	16636.	106	0.	0	160.025	.404344	.254331	-.91
33	-96.67	16084.	108	0.	0	160.025	.352993	.230085	-.74
34	-105.56	15187.	108	0.	0	160.025	.303156	.203788	-.59
35	-114.44	14095.	110	0.	0	160.025	.255023	.176088	-.45
36	-123.33	12986.	115	0.	0	160.025	.208180	.149238	-.32
37	-132.22	11943.	115	0.	0	160.025	.167491	.123308	-.20
38	-141.11	9818.	117	0.	0	160.025	.132847	.099962	-.11

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.88	50.	67.31	17315.	30	15449.	30
2.61	100.	129.50	17853.	30	13694.	30
3.55	150.	186.71	18116.	30	12042.	30
4.64	200.	239.10	18152.	30	10494.	30
5.81	250.	287.33	18180.	30	9061.	30
7.02	300.	331.78	18210.	30	7726.	30
8.25	350.	372.77	18236.	30	6479.	30
9.69	400.	410.58	18259.	30	5312.	30
11.26	450.	445.48	18278.	30	4222.	30
12.92	500.	477.69	18297.	30	3203.	30
14.18	550.	507.44	18314.	30	2257.	30
15.29	600.	534.91	18327.	30	1381.	4
16.49	650.	560.26	18339.	30	862.	4
17.81	700.	583.69	18349.	30	437.	4
19.26	750.	605.30	18359.	30	131.	3
20.85	800.	625.26	18367.	30	0.	38
22.60	850.	643.66	18378.	30	0.	38
24.55	900.	660.63	18389.	30	0.	38
26.73	950.	676.26	18398.	30	0.	38
29.15	1000.	690.67	18406.	30	0.	38
31.87	1050.	703.92	18414.	30	0.	38
34.96	1100.	716.04	18419.	30	0.	38
38.45	1150.	727.05	18421.	30	0.	38
42.44	1200.	736.92	18423.	30	0.	38
47.07	1250.	745.65	18422.	30	0.	38
52.41	1300.	753.49	18421.	30	0.	38
58.70	1350.	760.55	18417.	30	0.	38
66.13	1400.	766.53	18412.	30	0.	38
75.06	1450.	771.64	18409.	30	0.	38
86.00	1500.	776.02	18408.	30	0.	38
99.41	1550.	780.02	18406.	30	0.	38
116.47	1600.	783.64	18403.	30	0.	38
138.48	1650.	786.71	18396.	30	0.	38
167.95	1700.	788.83	18387.	30	0.	38
209.19	1750.	789.30	18378.	30	945.	4
269.16	1800.	787.84	18368.	30	1099.	5
365.33	1850.	785.55	18356.	30	1215.	5

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100, MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
138.48	1650.
209.19	1750.
269.16	1800.
294.96	1816.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
3 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	6
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	80.	230	310

TABLE 5 -- SOIL DATA

```
NUMBER OF TIP RESISTANCE PERCENTAGES     1
SIDE DAMPENING RESISTANCE  - JSIDE        .15
POINT DAMPENING RESISTANCE - JPONT        .15
SOIL QUAKE FOR SIDE        - QSIDE        .10
SOIL QUAKE FOR POINT       - QPOINT       .30
```

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 3 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,300,MINIMUM WALL THICKNESS=1,25 IN, RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN,	WEIGHT LBS	AREA SQ,IN,	COEF RSTITU	SPR STIFF LBS/IN,
1	0,00	1000,00	60000,00	1,00	,60	6200000,
2	0,00	1000,00	42000,00	1,00	,90	46122615,
3	160,00	0,00	6494,28	190,85	1,00	46122615,
4	150,00	0,00	6494,28	190,85	1,00	46122615,
5	140,00	0,00	6494,28	190,85	1,00	46122615,
6	130,00	0,00	6274,91	221,29	1,00	64173070,
7	121,67	0,00	6274,91	221,29	1,00	64173070,
8	113,33	0,00	6274,91	221,29	1,00	64173070,
9	105,00	0,00	6274,91	221,29	1,00	64173070,
10	96,67	0,00	6274,91	221,29	1,00	64173070,
11	88,33	0,00	6274,91	221,29	1,00	64173070,
12	80,00	0,00	6274,91	221,29	1,00	64173070,
13	71,67	0,00	6274,91	221,29	1,00	64173070,
14	63,33	0,00	6274,91	221,29	1,00	64173070,
15	55,00	0,00	6274,91	221,29	1,00	64173070,
16	46,67	0,00	6274,91	221,29	1,00	64173070,
17	38,33	0,00	6274,91	221,29	1,00	64173070,
18	30,00	0,00	5411,90	190,85	1,00	55347138,
19	21,67	0,00	5411,90	190,85	1,00	55347138,
20	13,33	0,00	5411,90	190,85	1,00	55347138,
21	5,00	0,00	5411,90	190,85	1,00	55347138,
22	-3,33	0,00	5411,90	190,85	1,00	55347138,
23	-11,67	0,00	5411,90	190,85	1,00	55347138,
24	-20,00	0,00	5411,90	190,85	1,00	55347138,
25	-28,33	0,00	5411,90	190,85	1,00	55347138,
26	-36,67	0,00	5411,90	190,85	1,00	55347138,
27	-45,00	0,00	5411,90	190,85	1,00	55347138,
28	-53,33	0,00	5411,90	190,85	1,00	55347138,
29	-61,67	0,00	5411,90	190,85	1,00	55347138,
30	-70,00	0,00	4840,27	160,03	1,00	43506865,
31	-78,89	0,00	4840,27	160,03	1,00	43506865,
32	-87,78	0,00	4840,27	160,03	1,00	43506865,
33	-96,67	0,00	4840,27	160,03	1,00	43506865,
34	-105,56	0,00	4840,27	160,03	1,00	43506865,
35	-114,44	0,00	4840,27	160,03	1,00	43506865,
36	-123,33	0,00	4840,27	160,03	1,00	43506865,
37	-132,22	0,00	4840,27	160,03	1,00	43506865,
38	-141,11	1000,00	4840,27	160,03	1,00	43506865,

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0337 INCHES
NUMBER OF BLOWS PER FOOT = 356.57
TOTAL INTERVALS = 158

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4071754.	25	0.	123	1.000	1.541367	1.541367	-.01
2	0.00	3158208.	35	0.	0	1.000	1.109306	1.069270	-.97
3	160.00	16846.	37	0.	0	190.852	1.086368	1.040812	-1.15
4	150.00	17112.	40	0.	0	190.852	1.074378	1.024042	-1.35
5	140.00	17291.	42	0.	0	190.852	1.061073	1.006499	-1.51
6	130.00	14934.	44	0.	0	221.286	1.046475	.988047	-1.60
7	121.67	14966.	47	0.	0	221.286	1.035304	.974272	-1.65
8	113.33	14997.	49	0.	0	221.286	1.023769	.959980	-1.70
9	105.00	15024.	51	0.	0	221.286	1.012299	.945046	-1.75
10	96.67	15034.	53	0.	0	221.286	1.000743	.929271	-1.83
11	88.33	14988.	55	0.	0	221.286	.988574	.912398	-1.92
12	80.00	14855.	57	0.	0	221.286	.975820	.894303	-1.96
13	71.67	14682.	59	0.	0	221.286	.962682	.875175	-1.94
14	63.33	14505.	61	0.	0	221.286	.957226	.855379	-1.86
15	55.00	14335.	63	0.	0	221.286	.943212	.835257	-1.75
16	46.67	14222.	66	0.	0	221.286	.933860	.814845	-1.68
17	38.33	14185.	68	0.	0	221.286	.923808	.793856	-1.67
18	30.00	16519.	71	0.	0	190.852	.912760	.772124	-1.69
19	21.67	16656.	73	0.	0	190.852	.898766	.746312	-1.67
20	13.33	16838.	75	0.	0	190.852	.883575	.720315	-1.57
21	5.00	17068.	77	0.	0	190.852	.867126	.694752	-1.42
22	-3.33	17274.	80	0.	0	190.852	.849074	.670041	-1.27
23	-11.67	17350.	82	0.	0	190.852	.829396	.646293	-1.09
24	-20.00	17272.	84	0.	0	190.852	.807972	.623404	-.90
25	-28.33	17106.	86	0.	0	190.852	.784704	.601127	-.74
26	-36.67	16883.	88	0.	0	190.852	.759787	.578880	-.62
27	-45.00	16533.	91	0.	0	190.852	.733685	.556257	-.45
28	-53.33	16206.	93	0.	0	190.852	.706972	.533452	-.27
29	-61.67	15869.	96	0.	0	190.852	.679091	.510618	-.15
30	-70.00	18471.	98	0.	0	160.025	.649462	.487568	-.07
31	-78.89	17802.	100	0.	0	160.025	.610150	.457978	.03
32	-87.78	16841.	102	0.	0	160.025	.571065	.428431	.05
33	-96.67	15992.	106	0.	0	160.025	.532678	.398866	.05
34	-105.56	15606.	108	0.	0	160.025	.493243	.369542	.03
35	-114.44	14803.	109	0.	0	160.025	.452076	.340599	-.02
36	-123.33	13978.	115	0.	0	160.025	.410338	.312263	-.06
37	-132.22	13637.	116	0.	0	160.025	.370197	.284824	-.12
38	-141.11	13129.	118	0.	0	160.025	.333654	.258603	-.20

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.79	50.	95.97	17341.	30	15286.	30
2.49	100.	184.35	17903.	30	13417.	30
3.42	150.	265.41	18168.	30	11663.	30
4.61	200.	339.40	18197.	30	10005.	30
6.01	250.	407.33	18217.	30	8510.	30
7.65	300.	469.84	18235.	30	7108.	30
9.30	350.	527.36	18257.	30	5790.	30
11.22	400.	580.28	18277.	30	4555.	30
13.48	450.	628.97	18295.	30	3406.	30
15.80	500.	673.74	18311.	30	2342.	30
17.30	550.	714.96	18327.	30	1533.	5
18.96	600.	752.92	18342.	30	1031.	5
20.82	650.	788.01	18355.	30	342.	3
22.90	700.	820.41	18366.	30	0.	38
25.25	750.	850.57	18377.	30	0.	38
27.93	800.	878.52	18386.	30	0.	38
31.00	850.	904.49	18396.	30	0.	38
34.53	900.	928.36	18404.	30	0.	38
38.65	950.	950.05	18411.	30	0.	38
43.52	1000.	969.53	18416.	30	0.	38
49.31	1050.	986.01	18421.	30	0.	38
56.30	1100.	1000.28	18428.	30	0.	38
64.94	1150.	1013.29	18436.	30	0.	38
75.85	1200.	1033.72	18444.	30	0.	38
89.85	1250.	1053.06	18452.	30	0.	38
108.63	1300.	1065.07	18458.	30	0.	38
134.85	1350.	1071.18	18463.	30	0.	38
173.67	1400.	1071.69	18466.	30	0.	38
237.39	1450.	1065.74	18469.	30	0.	38
356.57	1500.	1050.46	18471.	30	0.	38

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
134.85	1350.
195.81	1421.
237.39	1450.
288.98	1476.
300	1480

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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

  PROB
   4       42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
           200FT PENETRATION -- VULCAN 560 HAMMER
           QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN,   RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                          1
     NEW HAMMER DATA OPTION             1
     NEW MATERIAL DATA OPTION           1
     NEW PILE SECTION DATA OPTION       1
     NEW SOIL DATA OPTION               1
     SPECIFIED BLOW COUNT OPTION        1
     OUTPUT OPTION FOR STRESS           1
     BPF FOR STRESS OUTPUT OPTION                      275.
     ULTIMATE RESISTANCE INCREMENT (TONS)              50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)         300.
     SPECIFIED SEGMENT LENGTH (FT)                     -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION             VULCAN 560 HAMMER
     HAMMER EFFICIENCY                     .75
     HAMMER ENERGY (FT-LBS)          300000.00
     HAMMER EXPLOSIVE FORCE (LBS)        -0.00
     NUMBER OF HAMMER SEGMENTS               2

     SEGMENT     SLACK      WEIGHT      AREA    COEF OF    SPRING CONSTANT
      NUMBER     (IN)        (LB)     (SQ IN) RESTITUTION    (LB / IN)

        1       1000.00  60000.00      1.00       .60        6200000.00
        2       1000.00  42000.00      1.00       .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =    1

        MATERIAL      (TOD)   UNIT WT.    MODULUS
          TYPE                 (PCF)       (PSI)

            1        42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS        7
     NUMBER OF SECTIONS CHANGED           0
     NUMBER OF SECTIONS ADDED             0
```

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	50.	230	280
7	1	1.250	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES

200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	46122615.
3	160.00	0.00	6494.28	190.85	1.00	46122615.
4	150.00	0.00	6494.28	190.85	1.00	46122615.
5	140.00	0.00	6494.28	190.85	1.00	46122615.
6	130.00	0.00	6274.91	221.29	1.00	64173070.
7	121.67	0.00	6274.91	221.29	1.00	64173070.
8	113.33	0.00	6274.91	221.29	1.00	64173070.
9	105.00	0.00	6274.91	221.29	1.00	64173070.
10	96.67	0.00	6274.91	221.29	1.00	64173070.
11	88.33	0.00	6274.91	221.29	1.00	64173070.
12	80.00	0.00	6274.91	221.29	1.00	64173070.
13	71.67	0.00	6274.91	221.29	1.00	64173070.
14	63.33	0.00	6274.91	221.29	1.00	64173070.
15	55.00	0.00	6274.91	221.29	1.00	64173070.
16	46.67	0.00	6274.91	221.29	1.00	64173070.
17	38.33	0.00	6274.91	221.29	1.00	64173070.
18	30.00	0.00	5411.90	190.85	1.00	55347138.
19	21.67	0.00	5411.90	190.85	1.00	55347138.
20	13.33	0.00	5411.90	190.85	1.00	55347138.
21	5.00	0.00	5411.90	190.85	1.00	55347138.
22	-3.33	0.00	5411.90	190.85	1.00	55347138.
23	-11.67	0.00	5411.90	190.85	1.00	55347138.
24	-20.00	0.00	5411.90	190.85	1.00	55347138.
25	-28.33	0.00	5411.90	190.85	1.00	55347138.
26	-36.67	0.00	5411.90	190.85	1.00	55347138.
27	-45.00	0.00	5411.90	190.85	1.00	55347138.
28	-53.33	0.00	5411.90	190.85	1.00	55347138.
29	-61.67	0.00	5411.90	190.85	1.00	55347138.
30	-70.00	0.00	4537.75	160.03	1.00	46407322.
31	-78.33	0.00	4537.75	160.03	1.00	46407322.
32	-86.67	0.00	4537.75	160.03	1.00	46407322.
33	-95.00	0.00	4537.75	160.03	1.00	46407322.
34	-103.33	0.00	4537.75	160.03	1.00	46407322.
35	-111.67	0.00	4537.75	160.03	1.00	46407322.
36	-120.00	0.00	4840.27	160.03	1.00	43506865.
37	-128.89	0.00	4840.27	160.03	1.00	43506865.
38	-137.78	0.00	4840.27	160.03	1.00	43506865.
39	-146.67	0.00	4840.27	160.03	1.00	43506865.
40	-155.56	0.00	4840.27	160.03	1.00	43506865.
41	-164.44	0.00	4840.27	160.03	1.00	43506865.
42	-173.33	0.00	4840.27	160.03	1.00	43506865.
43	-182.22	0.00	4840.27	160.03	1.00	43506865.
44	-191.11	1000.00	4840.27	160.03	1.00	43506865.

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0370 INCHES
NUMBER OF BLOWS PER FOOT = 324.62
TOTAL INTERVALS = 472

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4071900.	25	0.	472	1.000	1.526877	-10.129674	-15.54
2	0.00	3156646.	35	0.	472	1.000	1.096510	-1.043281	-1.40
3	160.00	16854.	38	672.	216	190.852	1.072020	.497581	.29
4	150.00	17101.	41	1019.	219	190.852	1.058256	.496793	.25
5	140.00	17296.	43	1128.	221	190.852	1.043148	.495205	.23
6	130.00	14943.	45	941.	223	221.286	1.027302	.492804	.21
7	121.67	14967.	47	996.	226	221.286	1.015919	.490490	.20
8	113.33	14988.	50	1113.	351	221.286	1.004679	.487648	.18
9	105.00	15019.	52	1242.	349	221.286	.992892	.484232	.17
10	96.67	15031.	54	1341.	350	221.286	.980407	.480235	.15
11	88.33	14985.	56	1411.	348	221.286	.967504	.475662	.14
12	80.00	14852.	58	1473.	348	221.286	.955821	.470508	.13
13	71.67	14681.	60	1517.	346	221.286	.946577	.464839	.11
14	63.33	14506.	62	1569.	348	221.286	.937653	.458611	.09
15	55.00	14337.	64	1599.	345	221.286	.928247	.451915	.08
16	46.67	14221.	67	1614.	346	221.286	.917957	.444671	.07
17	38.33	14191.	69	1617.	348	221.286	.906397	.436942	.06
18	30.00	16543.	72	1871.	346	190.852	.893323	.428755	.05
19	21.67	16708.	74	1861.	348	190.852	.876352	.418813	.05
20	13.33	16930.	76	1906.	327	190.852	.857526	.408475	.05
21	5.00	17223.	79	2007.	323	190.852	.836956	.397691	.06
22	-3.33	17486.	81	2066.	319	190.852	.814459	.386557	.06
23	-11.67	17589.	83	2082.	319	190.852	.789802	.375229	.06
24	-20.00	17525.	85	2006.	316	190.852	.763079	.363940	.05
25	-28.33	17397.	88	1848.	317	190.852	.734138	.352849	.04
26	-36.67	17196.	90	1595.	319	190.852	.703082	.341977	.03
27	-45.00	16843.	93	1234.	320	190.852	.669976	.331323	.01
28	-53.33	16501.	95	777.	323	190.852	.635139	.320652	.00
29	-61.67	16169.	98	228.	325	190.852	.598679	.309809	-.00
30	-70.00	18748.	100	0.	0	160.025	.560975	.298554	-.00
31	-78.33	18093.	102	0.	0	160.025	.516190	.284316	-.00
32	-86.67	17369.	105	0.	0	160.025	.471702	.268923	-.00
33	-95.00	16518.	107	0.	0	160.025	.428111	.251951	.01
34	-103.33	15580.	110	0.	0	160.025	.385421	.233052	.00
35	-111.67	14489.	113	0.	0	160.025	.344179	.212244	-.00
36	-120.00	13544.	113	0.	0	160.025	.304034	.190128	-.00
37	-128.89	12562.	116	0.	0	160.025	.261741	.165876	-.01
38	-137.78	11707.	120	0.	0	160.025	.220718	.141743	-.01
39	-146.67	10776.	122	0.	0	160.025	.181884	.118606	-.01

42	-1[illegible]3	6481.	126	0.	0	.025	.095006	.063758	-.01
43	-1[illegible]2	5123.	124	0.	0	.025	.076794	.052768	-.01
44	-191.11	4185.	128	0.	0	160.025	.061966	.045356	-.01

PROB 4 42-IN. DIAMETER PILES MLW=10SFT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.95	50.	27.08	17287.	5	15347.	32
2.81	100.	52.25	17776.	30	13790.	33
3.79	150.	75.60	18199.	30	12342.	33
4.64	200.	97.06	18268.	30	10966.	33
5.43	250.	116.85	18302.	30	9769.	35
6.35	300.	135.14	18331.	30	8671.	35
7.39	350.	152.02	18357.	30	7667.	36
8.55	400.	167.59	18382.	30	6747.	36
11.13	450.	181.95	18403.	30	5874.	36
11.94	500.	195.17	18425.	30	5046.	36
12.81	550.	207.34	18445.	30	4280.	37
13.75	600.	218.53	18463.	30	3585.	37
14.77	650.	228.80	18480.	30	2921.	37
15.87	700.	238.21	18496.	30	2288.	37
17.07	750.	246.82	18517.	30	1730.	38
18.38	800.	254.67	18537.	30	1203.	38
19.82	850.	261.81	18556.	30	693.	38
21.40	900.	268.26	18573.	30	197.	38
23.14	950.	274.08	18590.	30	0.	44
25.07	1000.	279.27	18605.	30	0.	44
27.21	1050.	283.89	18620.	30	0.	44
29.60	1100.	288.10	18633.	30	0.	44
32.28	1150.	291.77	18645.	30	0.	44
35.31	1200.	294.93	18656.	30	0.	44
38.75	1250.	297.60	18665.	30	0.	44
42.66	1300.	299.90	18674.	30	0.	44
47.16	1350.	301.91	18682.	30	0.	44
52.33	1400.	303.66	18690.	30	0.	44
58.36	1450.	305.13	18697.	30	0.	44
65.43	1500.	306.12	18704.	30	0.	44
73.77	1550.	306.42	18708.	30	0.	44
83.77	1600.	306.05	18715.	30	0.	44
95.68	1650.	305.76	18722.	30	0.	44
110.10	1700.	309.21	18729.	30	0.	44
127.60	1750.	313.13	18734.	30	0.	44
148.37	1800.	317.12	18739.	30	0.	44
172.10	1850.	321.30	18743.	30	1058.	21
200.35	1900.	325.42	18747.	30	1238.	22
233.54	1950.	329.20	18748.	30	1387.	22
274.07	2000.	332.13	18749.	30	2057.	23
324.62	2050.	334.88	18748.	30	2082.	23

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025, MINIMUM WALL THICKNESS=1.25 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
127.60	1750.
200.35	1900.
235.54	1950.
324.62	2050.

```
WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

 PROB
   5      42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
          200FT PENETRATION -- VULCAN 560 HAMMER
          QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN.    RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                              1
     NEW HAMMER DATA OPTION                 1
     NEW MATERIAL DATA OPTION               1
     NEW PILE SECTION DATA OPTION           1
     NEW SOIL DATA OPTION                   1
     SPECIFIED BLOW COUNT OPTION            1
     OUTPUT OPTION FOR STRESS               1
     BPF FOR STRESS OUTPUT OPTION                      275.
     ULTIMATE RESISTANCE INCREMENT (TONS)               50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)         300.
     SPECIFIED SEGMENT LENGTH (FT)                     -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION              VULCAN 560 HAMMER
     HAMMER EFFICIENCY                      .75
     HAMMER ENERGY (FT-LBS)           300000.00
     HAMMER EXPLOSIVE FORCE (LBS)         -0.00
     NUMBER OF HAMMER SEGMENTS                2

     SEGMENT     SLACK       WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER      (IN)        (LB)     (SQ IN) RESTITUTION    (LB / IN)

        1        1000.00  60000.00      1.00        .60       6200000.00
        2        1000.00  42000.00      1.00        .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)    UNIT WT.    MODULUS
           TYPE                  (PCF)       (PSI)

             1         42.000      490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS          7
     NUMBER OF SECTIONS CHANGED             0
     NUMBER OF SECTIONS ADDED               0
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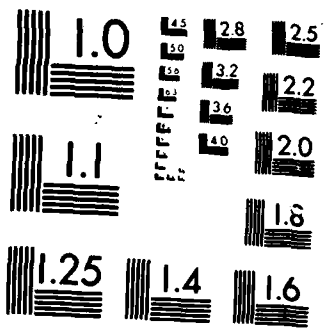
AD-A163 522 FOUNDATION ANALYSIS EAST COAST AIR COMBAT MANEUVERING RANGE OFFSHORE KITT..(U) CREST ENGINEERING INC TULSA OK SEP 76 27-771-97 CHES/NAVFAC-FPO-7612 N62477-76-C-0179 5/6

UNCLASSIFIED F/G 13/13 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	50.	230	280
7	1	1.250	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	46122615.
3	160.00	0.00	6494.28	190.85	1.00	46122615.
4	150.00	0.00	6494.28	190.85	1.00	46122615.
5	140.00	0.00	6494.28	190.85	1.00	46122615.
6	130.00	0.00	6274.91	221.29	1.00	64173070.
7	121.67	0.00	6274.91	221.29	1.00	64173070.
8	113.33	0.00	6274.91	221.29	1.00	64173070.
9	105.00	0.00	6274.91	221.29	1.00	64173070.
10	96.67	0.00	6274.91	221.29	1.00	64173070.
11	88.33	0.00	6274.91	221.29	1.00	64173070.
12	80.00	0.00	6274.91	221.29	1.00	64173070.
13	71.67	0.00	6274.91	221.29	1.00	64173070.
14	63.33	0.00	6274.91	221.29	1.00	64173070.
15	55.00	0.00	6274.91	221.29	1.00	64173070.
16	46.67	0.00	6274.91	221.29	1.00	64173070.
17	38.33	0.00	6274.91	221.29	1.00	64173070.
18	30.00	0.00	5411.90	190.85	1.00	55347138.
19	21.67	0.00	5411.90	190.85	1.00	55347138.
20	13.33	0.00	5411.90	190.85	1.00	55347138.
21	5.00	0.00	5411.90	190.85	1.00	55347138.
22	-3.33	0.00	5411.90	190.85	1.00	55347138.
23	-11.67	0.00	5411.90	190.85	1.00	55347138.
24	-20.00	0.00	5411.90	190.85	1.00	55347138.
25	-28.33	0.00	5411.90	190.85	1.00	55347138.
26	-36.67	0.00	5411.90	190.85	1.00	55347138.
27	-45.00	0.00	5411.90	190.85	1.00	55347138.
28	-53.33	0.00	5411.90	190.85	1.00	55347138.
29	-61.67	0.00	5411.90	190.85	1.00	55347138.
30	-70.00	0.00	4537.75	160.03	1.00	46407322.
31	-78.33	0.00	4537.75	160.03	1.00	46407322.
32	-86.67	0.00	4537.75	160.03	1.00	46407322.
33	-95.00	0.00	4537.75	160.03	1.00	46407322.
34	-103.33	0.00	4537.75	160.03	1.00	46407322.
35	-111.67	0.00	4537.75	160.03	1.00	46407322.
36	-120.00	0.00	4840.27	160.03	1.00	43506865.
37	-128.89	0.00	4840.27	160.03	1.00	43506865.
38	-137.78	0.00	4840.27	160.03	1.00	43506865.
39	-146.67	0.00	4840.27	160.03	1.00	43506865.
40	-155.56	0.00	4840.27	160.03	1.00	43506865.
41	-164.44	0.00	4840.27	160.03	1.00	43506865.
42	-173.33	0.00	4840.27	160.03	1.00	43506865.
43	-182.22	0.00	4840.27	160.03	1.00	43506865.
44	-191.11	1000.00	4840.27	160.03	1.00	43506865.

PROB 5 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,100,MINIMUM WALL THICKNESS=1,25 IN, RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35,00

PERMANENT SET OF PILE = ,0413 INCHES
NUMBER OF BLOWS PER FOOT = 290,72
TOTAL INTERVALS = 163

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4071900,	25	0,	125	1,000	1,552598	1,552598	-,00
2	0,00	3156646,	35	0,	0	1,000	1,119031	1,087326	-,81
3	160,00	16854,	38	0,	0	190,852	1,097423	1,058586	-1,05
4	150,00	17101,	41	0,	0	190,852	1,087014	1,041233	-1,30
5	140,00	17296,	43	0,	0	190,852	1,075271	1,022892	-1,54
6	130,00	14943,	45	0,	0	221,286	1,062307	1,003578	-1,75
7	121,67	14967,	47	0,	0	221,286	1,052214	,988866	-1,87
8	113,33	14988,	50	0,	0	221,286	1,041359	,973360	-1,95
9	105,00	15019,	52	0,	0	221,286	1,029924	,957176	-2,01
10	96,67	15031,	54	0,	0	221,286	1,018181	,940353	-2,05
11	88,33	14985,	56	0,	0	221,286	1,006563	,922905	-2,06
12	80,00	14852,	58	0,	0	221,286	,994658	,904868	-2,06
13	71,67	14681,	60	0,	0	221,286	,982084	,886257	-2,02
14	63,33	14506,	62	0,	0	221,286	,968906	,867134	-1,94
15	55,00	14337,	64	0,	0	221,286	,955877	,847563	-1,86
16	46,67	14219,	67	0,	0	221,286	,946626	,827598	-1,76
17	38,33	14181,	69	0,	0	221,286	,937307	,807317	-1,66
18	30,00	16505,	71	0,	0	190,852	,927409	,786730	-1,57
19	21,67	16624,	74	0,	0	190,852	,915244	,762557	-1,50
20	13,33	16781,	76	0,	0	190,852	,902112	,738096	-1,45
21	5,00	16975,	78	0,	0	190,852	,887668	,713361	-1,41
22	-3,33	17144,	81	0,	0	190,852	,871677	,688486	-1,36
23	-11,67	17192,	83	0,	0	190,852	,853958	,663751	-1,28
24	-20,00	17098,	85	0,	0	190,852	,834327	,639438	-1,17
25	-28,33	16935,	87	0,	0	190,852	,812715	,615478	-1,04
26	-36,67	16732,	89	0,	0	190,852	,788855	,591666	-,90
27	-45,00	16452,	92	0,	0	190,852	,762797	,567676	-,78
28	-53,33	16191,	94	0,	0	190,852	,734699	,543144	-,65
29	-61,67	15979,	97	0,	0	190,852	,704974	,518052	-,51
30	-70,00	18729,	99	0,	0	160,025	,674014	,492694	-,34
31	-78,33	18318,	102	0,	0	160,025	,636490	,462452	-,11
32	-86,67	17866,	104	0,	0	160,025	,599047	,432540	,03
33	-95,00	17319,	106	0,	0	160,025	,561584	,402588	,03
34	-103,33	16712,	109	0,	0	160,025	,524752	,372325	-,01
35	-111,67	16019,	111	0,	0	160,025	,488255	,341822	,02
36	-120,00	15318,	113	0,	0	160,025	,451468	,311524	,03
37	-128,89	14550,	115	0,	0	160,025	,410997	,279542	,03
38	-137,78	13803,	118	0,	0	160,025	,369120	,248304	,09
39	-146,67	13507,	122	0,	0	160,025	,327293	,218233	,12
40	-155,56	13183,	123	0,	0	160,025	,286299	,189691	,11

42	-1[illegible]	11794.	129	0.	0	[illegible].025	.206305	.138638	.04
43	-1[illegible]	11120.	130	0.	0	[illegible].025	.172015	.116834	-.04
44	-19[illegible].11	9499.	131	0.	0	160.025	.141276	.098166	-.11

PROB 5 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.78	50.	67.48	17289.	5	15136.	32
2.64	100.	129.91	17826.	30	13399.	33
3.72	150.	187.56	18266.	30	11806.	33
4.75	200.	240.20	18299.	30	10289.	33
5.56	250.	288.62	18326.	30	8874.	34
6.73	300.	333.20	18349.	30	7650.	35
7.94	350.	374.25	18370.	30	6510.	35
11.07	400.	412.05	18390.	30	5465.	36
11.96	450.	446.82	18408.	30	4507.	36
12.93	500.	478.83	18426.	30	3614.	36
13.97	550.	508.27	18444.	30	2781.	5
15.11	600.	535.32	18460.	30	1982.	36
16.36	650.	560.18	18474.	30	1316.	4
17.73	700.	582.98	18489.	30	822.	3
19.24	750.	603.88	18503.	30	509.	3
20.90	800.	623.04	18517.	30	255.	3
22.75	850.	640.53	18531.	30	0.	44
24.82	900.	656.52	18543.	30	0.	44
27.14	950.	671.10	18557.	30	0.	44
29.76	1000.	684.37	18572.	30	0.	44
32.73	1050.	696.42	18587.	30	0.	44
36.11	1100.	707.30	18601.	30	0.	44
40.00	1150.	717.01	18614.	30	0.	44
44.53	1200.	725.55	18627.	30	0.	44
49.80	1250.	732.91	18640.	30	0.	44
56.04	1300.	739.36	18652.	30	0.	44
63.52	1350.	744.91	18663.	30	0.	44
72.52	1400.	749.34	18673.	30	0.	44
83.63	1450.	752.90	18683.	30	0.	44
97.63	1500.	755.83	18691.	30	0.	44
115.46	1550.	758.29	18700.	30	0.	44
139.17	1600.	760.55	18707.	30	0.	44
171.64	1650.	762.14	18715.	30	0.	44
218.34	1700.	762.28	18722.	30	0.	44
290.72	1750.	760.02	18729.	30	0.	44
413.34	1800.	756.61	18736.	30	0.	44

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.25 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
139.17	1600.
218.34	1700.
245.67	1722.
290.72	1750.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB	
6	42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES 200FT PENETRATION -- VULCAN 560 HAMMER QTIP=.300, MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1	
NEW HAMMER DATA OPTION	1	
NEW MATERIAL DATA OPTION	1	
NEW PILE SECTION DATA OPTION	1	
NEW SOIL DATA OPTION	1	
SPECIFIED BLOW COUNT OPTION	1	
OUTPUT OPTION FOR STRESS	1	
BPF FOR STRESS OUTPUT OPTION		275.
ULTIMATE RESISTANCE INCREMENT (TONS)		50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)		300.
SPECIFIED SEGMENT LENGTH (FT)		-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	7
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.500	30.	0	30
2	1	1.750	50.	30	80
3	1	1.750	50.	80	130
4	1	1.500	50.	130	180
5	1	1.500	50.	180	230
6	1	1.250	50.	230	280
7	1	1.250	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	46122615.
3	160.00	0.00	6494.28	190.85	1.00	46122615.
4	150.00	0.00	6494.28	190.85	1.00	46122615.
5	140.00	0.00	6494.28	190.85	1.00	46122615.
6	130.00	0.00	6274.91	221.29	1.00	64173070.
7	121.67	0.00	6274.91	221.29	1.00	64173070.
8	113.33	0.00	6274.91	221.29	1.00	64173070.
9	105.00	0.00	6274.91	221.29	1.00	64173070.
10	96.67	0.00	6274.91	221.29	1.00	64173070.
11	88.33	0.00	6274.91	221.29	1.00	64173070.
12	80.00	0.00	6274.91	221.29	1.00	64173070.
13	71.67	0.00	6274.91	221.29	1.00	64173070.
14	63.33	0.00	6274.91	221.29	1.00	64173070.
15	55.00	0.00	6274.91	221.29	1.00	64173070.
16	46.67	0.00	6274.91	221.29	1.00	64173070.
17	38.33	0.00	6274.91	221.29	1.00	64173070.
18	30.00	0.00	5411.90	190.85	1.00	55347138.
19	21.67	0.00	5411.90	190.85	1.00	55347138.
20	13.33	0.00	5411.90	190.85	1.00	55347138.
21	5.00	0.00	5411.90	190.85	1.00	55347138.
22	-3.33	0.00	5411.90	190.85	1.00	55347138.
23	-11.67	0.00	5411.90	190.85	1.00	55347138.
24	-20.00	0.00	5411.90	190.85	1.00	55347138.
25	-28.33	0.00	5411.90	190.85	1.00	55347138.
26	-36.67	0.00	5411.90	190.85	1.00	55347138.
27	-45.00	0.00	5411.90	190.85	1.00	55347138.
28	-53.33	0.00	5411.90	190.85	1.00	55347138.
29	-61.67	0.00	5411.90	190.85	1.00	55347138.
30	-70.00	0.00	4537.75	160.03	1.00	46407322.
31	-78.33	0.00	4537.75	160.03	1.00	46407322.
32	-86.67	0.00	4537.75	160.03	1.00	46407322.
33	-95.00	0.00	4537.75	160.03	1.00	46407322.
34	-103.33	0.00	4537.75	160.03	1.00	46407322.
35	-111.67	0.00	4537.75	160.03	1.00	46407322.
36	-120.00	0.00	4840.27	160.03	1.00	43506865.
37	-128.89	0.00	4840.27	160.03	1.00	43506865.
38	-137.78	0.00	4840.27	160.03	1.00	43506865.
39	-146.67	0.00	4840.27	160.03	1.00	43506865.
40	-155.56	0.00	4840.27	160.03	1.00	43506865.
41	-164.44	0.00	4840.27	160.03	1.00	43506865.
42	-173.33	0.00	4840.27	160.03	1.00	43506865.
43	-182.22	0.00	4840.27	160.03	1.00	43506865.
44	-191.11	1000.00	4840.27	160.03	1.00	43506865.

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE B -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0429 INCHES
NUMBER OF BLOWS PER FOOT = 279.51
TOTAL INTERVALS = 172

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4071900.	25	0.	127	1.000	1.590111	1.590111	-.02
2	0.00	3156640.	35	0.	0	1.000	1.151993	1.143731	-.50
3	160.00	16854.	38	0.	0	190.852	1.133206	1.114421	-.68
4	150.00	17101.	41	0.	0	190.852	1.126775	1.096846	-.88
5	140.00	17296.	43	0.	0	190.852	1.119641	1.078701	-1.07
6	130.00	14943.	45	0.	0	221.286	1.111465	1.060100	-1.25
7	121.67	14967.	47	0.	0	221.286	1.104695	1.040472	-1.34
8	113.33	14988.	50	0.	0	221.286	1.096909	1.032657	-1.47
9	105.00	15019.	52	0.	0	221.286	1.088065	1.018729	-1.55
10	96.67	15031.	54	0.	0	221.286	1.078088	1.004684	-1.60
11	88.33	14985.	56	0.	0	221.286	1.067105	.990542	-1.60
12	80.00	14852.	58	0.	0	221.286	1.055436	.976340	-1.57
13	71.67	14681.	60	0.	0	221.286	1.043381	.962191	-1.52
14	63.33	14506.	62	0.	0	221.286	1.031431	.948151	-1.46
15	55.00	14337.	64	0.	0	221.286	1.019191	.934105	-1.40
16	46.67	14217.	67	0.	0	221.286	1.006231	.919852	-1.37
17	38.33	14175.	69	0.	0	221.286	.992651	.905084	-1.38
18	30.00	16485.	71	0.	0	190.852	.979343	.889464	-1.39
19	21.67	16568.	74	0.	0	190.852	.966713	.870392	-1.37
20	13.33	16681.	76	0.	0	190.852	.955879	.850560	-1.30
21	5.00	16816.	78	0.	0	190.852	.944965	.830260	-1.18
22	-3.33	16923.	80	0.	0	190.852	.933369	.809659	-1.06
23	-11.67	16928.	82	0.	0	190.852	.920966	.788739	-1.02
24	-20.00	16801.	84	0.	0	190.852	.906097	.767160	-1.05
25	-28.33	16622.	87	0.	0	190.852	.889925	.744675	-1.09
26	-36.67	16422.	89	0.	0	190.852	.871844	.721430	-1.09
27	-45.00	16154.	91	0.	0	190.852	.851050	.697027	-1.04
28	-53.33	15949.	94	0.	0	190.852	.830318	.674685	-.93
29	-61.67	15784.	96	0.	0	190.852	.807172	.651836	-.80
30	-70.00	18642.	99	0.	0	160.025	.782822	.629321	-.67
31	-78.33	18398.	101	0.	0	160.025	.753095	.602564	-.52
32	-86.67	18107.	103	0.	0	160.025	.723402	.575599	-.41
33	-95.00	17757.	105	0.	0	160.025	.690540	.548101	-.32
34	-103.33	17377.	108	0.	0	160.025	.667488	.520449	-.21
35	-111.67	16924.	110	0.	0	160.025	.640884	.493056	-.12
36	-120.00	16455.	112	0.	0	160.025	.613150	.465930	-.08
37	-128.89	15839.	114	0.	0	160.025	.582116	.437448	-.05
38	-137.78	14975.	116	0.	0	160.025	.550885	.409670	-.05
39	-146.67	14117.	120	0.	0	160.025	.519567	.382407	-.07
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	160.025	.484232	.355779	-.11

42	-1[illegible]33	13000.	130	0.	0	[illegible].025	.412896	.304815	-.23
43	-1.[illegible]2	13162.	131	0.	0	.025	.376933	.280741	-.31
44	-191.11	13066.	133	0.	0	160.025	.342933	.257973	-.43

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.61	50.	96.18	17291.	5	14985.	32
2.33	100.	184.86	17852.	32	13119.	33
3.40	150.	266.49	18295.	30	11425.	33
4.65	200.	340.82	18321.	30	9811.	33
5.81	250.	408.96	18343.	30	8349.	34
7.30	300.	471.61	18361.	30	7027.	34
8.85	350.	529.23	18378.	30	5810.	35
10.66	400.	582.21	18394.	30	4691.	18
12.83	450.	630.88	18409.	30	3655.	18
15.31	500.	675.51	18423.	30	2718.	7
16.82	550.	716.45	18438.	30	2062.	6
18.49	600.	754.02	18452.	30	1519.	5
20.36	650.	788.48	18465.	30	957.	5
22.47	700.	820.23	18477.	30	211.	6
24.86	750.	849.49	18489.	30	0.	44
27.59	800.	876.76	18502.	30	0.	44
30.72	850.	901.68	18513.	30	0.	44
34.37	900.	924.69	18525.	30	0.	44
38.65	950.	945.71	18536.	30	0.	44
43.72	1000.	964.32	18547.	30	0.	44
49.83	1050.	980.50	18556.	30	0.	44
57.31	1100.	994.05	18566.	30	0.	44
66.60	1150.	1005.23	18575.	30	0.	44
78.49	1200.	1023.07	18585.	30	0.	44
94.19	1250.	1038.65	18597.	30	0.	44
115.59	1300.	1050.04	18609.	30	0.	44
146.51	1350.	1056.11	18620.	30	0.	44
195.01	1400.	1056.39	18631.	30	0.	44
279.51	1450.	1045.47	18642.	30	0.	44
462.50	1500.	1028.73	18652.	30	0.	44

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.25 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
146.51	1350.
195.01	1400.
243.45	1433.
279.51	1450.

Pile Driving Resistance Curves

Pile Diameter	- 42 in.
Minimum Wall Thickness	- 1.50 in.
Penetration	- 150 ft.
	- 200 ft.
Hammer	- Vulcan 560
Quake Factor, tip	- .025 in.
	- .10 in.
	- .30 in.

UNITED COMPUTING 67. APEX/SL B.2.0

07.05.40. 06/10/76.

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JJJJJJJJJJJ  YY        YY  JJJJJJJJJJJ      111     RRRRRRRRRRR   BBBBBBBBBBB   LL
JJJJJJJJJJJ  YY        YY  JJJJJJJJJJJ     1111     RRRRRRRRRRRR  BBBBBBBBBBBB  LL
    JJ       YY        YY       JJ        1 11     RR        RR  BB        BB  LL
    JJ       YY        YY       JJ          11     RR        RR  BB        BB  LL
    JJ       YY        YY       JJ          11     RR        RR  BB        BB  LL
    JJ       YY        YY       JJ          11     RR        RR  BB        BB  LL
    JJ       YYY      YYY       JJ          11     RR        RR  BB        BB  LL
    JJ        YYY    YYY        JJ          11     RRRRRRRRRRRR  BBBBBBBBBBBB  LL
    JJ         YYY  YYY         JJ          11     RRRRRRRRRRR   BBBBBBBBBBB   LL
    JJ           YYYY           JJ          11     RR  RR        BB        BB  LL
    JJ            YY            JJ          11     RR   RR       BB        BB  LL
    JJ            YY            JJ          11     RR    RR      BB        BB  LL
    JJ            YY            JJ          11     RR     RR     BB        BB  LL
JJ  JJ            YY        JJ  JJ          11     RR      RR    BB        BB  LL         LL
JJJJJJ            YY        JJJJJJ     111111111111 RR       RR   BBBBBBBBBBBB  LLLLLLLLLLLL
 JJJJ             YY         JJJJ      111111111111 RR        RR  BBBBBBBBBBB   LLLLLLLLLLLL
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WAVE ... ATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	6
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0
LENGTH OF FREE STANDING PILE(FT)	160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES	1
SIDE DAMPENING RESISTANCE = JSIDE	.15
POINT DAMPENING RESISTANCE = JPOINT	.15
SOIL QUAKE FOR SIDE = QSIDE	.10
SOIL QUAKE FOR POINT = QPOINT	.03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5772.69	190.85	1.00	51887942.
31	-78.89	0.00	5772.69	190.85	1.00	51887942.
32	-87.78	0.00	5772.69	190.85	1.00	51887942.
33	-96.67	0.00	5772.69	190.85	1.00	51887942.
34	-105.56	0.00	5772.69	190.85	1.00	51887942.
35	-114.44	0.00	5772.69	190.85	1.00	51887942.
36	-123.33	0.00	5772.69	190.85	1.00	51887942.
37	-132.22	0.00	5772.69	190.85	1.00	51887942.
38	-141.11	1000.00	5772.69	190.85	1.00	51887942.

PROB I 42-IN. DIAMETER PILES MLW+105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0401 INCHES
NUMBER OF BLOWS PER FOOT = 299.37
TOTAL INTERVALS = 256

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4126428.	25	0.	256	1.000	1.375617	-1.915396	-15.54
2	0.00	3392390.	34	0.	256	1.000	.948497	-.096984	-2.70
3	160.00	15587.	37	613.	195	221.286	.924500	.145682	-1.16
4	150.00	15795.	39	1052.	197	221.286	.911769	.145939	-1.15
5	140.00	15950.	42	1439.	200	221.286	.899850	.146444	-1.11
6	130.00	14073.	44	1390.	202	251.328	.888393	.147483	-1.10
7	121.67	14100.	46	1221.	203	251.328	.879639	.148552	-1.06
8	113.33	14126.	48	1022.	205	251.328	.870897	.150068	-1.06
9	105.00	14150.	50	788.	208	251.328	.863201	.151760	-1.04
10	96.67	14162.	52	710.	256	251.328	.857132	.153878	-1.06
11	88.33	14130.	54	758.	256	251.328	.851723	.156326	-1.05
12	80.00	14025.	56	869.	255	251.328	.846277	.158939	-1.00
13	71.67	13883.	58	930.	256	251.328	.840062	.161865	-1.02
14	63.33	13742.	60	942.	256	251.328	.832438	.165090	-1.00
15	55.00	13621.	63	933.	256	251.328	.822772	.168338	-.97
16	46.67	13544.	65	927.	223	251.328	.810823	.171557	-.93
17	38.33	13539.	67	986.	226	251.328	.796307	.174680	-.88
18	30.00	15530.	70	1212.	228	221.286	.779151	.177594	-.82
19	21.67	15783.	72	1320.	230	221.286	.756736	.180685	-.74
20	13.33	16167.	75	1420.	232	221.286	.731315	.183201	-.61
21	5.00	16664.	77	1511.	235	221.286	.702807	.185272	-.52
22	-3.33	17104.	80	1526.	237	221.286	.671258	.187158	-.46
23	-11.67	17335.	82	1377.	239	221.286	.636956	.188556	-.38
24	-20.00	17349.	84	1067.	241	221.286	.600680	.189346	-.38
25	-28.33	17224.	87	597.	243	221.286	.562661	.189629	-.45
26	-36.67	16933.	89	0.	0	221.286	.523307	.188964	-.50
27	-45.00	16362.	91	0.	0	221.286	.482774	.186474	-.48
28	-53.33	15738.	94	0.	0	221.286	.441616	.181774	-.47
29	-61.67	15002.	97	0.	0	221.286	.399858	.174934	-.53
30	-70.00	16319.	100	0.	0	190.852	.358068	.165760	-.60
31	-78.89	15146.	103	0.	0	190.852	.306407	.151108	-.67
32	-87.78	14090.	104	0.	0	190.852	.256296	.133879	-.66
33	-96.67	12954.	106	0.	0	190.852	.208960	.115123	-.59
34	-105.56	11356.	107	0.	0	190.852	.166918	.096202	-.50
35	-114.44	9284.	109	0.	0	190.852	.131465	.078531	-.39
36	-123.33	7193.	110	0.	0	190.852	.103202	.063541	-.28
37	-132.22	5378.	113	0.	0	190.852	.081513	.052638	-.19
38	-141.11	4136.	111	0.	0	190.852	.065084	.045963	-.11

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.04	50.	25.57	15936.	5	14910.	30
2.79	100.	49.56	16262.	30	13646.	30
3.73	150.	72.03	16556.	30	12450.	30
4.68	200.	92.96	16639.	30	11304.	30
5.69	250.	112.49	16669.	30	10226.	30
6.62	300.	130.76	16690.	30	9211.	30
7.54	350.	147.86	16714.	30	8253.	30
8.58	400.	163.85	16736.	30	7342.	30
9.74	450.	178.81	16752.	30	6480.	30
11.03	500.	192.80	16768.	30	5663.	30
12.39	550.	205.87	16780.	30	4895.	30
13.83	600.	218.08	16789.	30	4189.	31
14.68	650.	229.50	16798.	30	3524.	31
15.58	700.	240.20	16805.	30	2890.	31
16.54	750.	250.19	16808.	30	2279.	31
17.56	800.	259.53	16809.	30	1699.	31
18.67	850.	268.25	16817.	30	1182.	32
19.85	900.	276.38	16824.	30	681.	32
21.13	950.	283.95	16828.	30	198.	32
22.51	1000.	290.99	16829.	30	0.	38
24.01	1050.	297.52	16829.	30	0.	38
25.63	1100.	303.56	16826.	30	0.	38
27.39	1150.	309.13	16822.	30	0.	38
29.32	1200.	314.21	16816.	30	0.	38
31.43	1250.	318.87	16809.	30	0.	38
33.76	1300.	323.09	16800.	30	0.	38
36.31	1350.	326.94	16789.	30	0.	38
39.14	1400.	330.46	16782.	30	0.	38
42.27	1450.	333.67	16774.	30	0.	38
45.75	1500.	336.58	16764.	30	0.	38
49.66	1550.	339.27	16753.	30	0.	38
54.02	1600.	341.74	16740.	30	0.	38
58.97	1650.	343.96	16751.	23	0.	38
64.53	1700.	345.88	16790.	23	0.	38
70.88	1750.	347.31	16828.	23	1163.	7
78.12	1800.	348.17	16867.	23	1203.	22
86.41	1850.	348.42	16905.	23	1243.	22
95.99	1900.	348.47	16942.	23	1286.	22
107.00	1950.	351.70	16985.	24	1327.	22
119.76	2000.	356.31	17027.	24	1364.	22
134.35	2050.	361.15	17069.	24	1391.	22
150.77	2100.	366.06	17111.	24	1412.	22
168.55	2150.	371.10	17152.	24	1428.	22
188.19	2200.	376.25	17192.	24	1455.	22
210.61	2250.	381.35	17231.	24	1475.	22
235.78	2300.	386.39	17271.	24	1499.	22

299.37	2400.	399.70	17349.	24	1526.	22
339.90	2450.	398.34	17387.	24	1535.	22

PROB 1 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
134.35	2050.
188.19	2200.
235.78	2300.
299.37	2400.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
2   42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN.   RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	6
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5772.69	190.85	1.00	51887942.
31	-78.89	0.00	5772.69	190.85	1.00	51887942.
32	-87.78	0.00	5772.69	190.85	1.00	51887942.
33	-96.67	0.00	5772.69	190.85	1.00	51887942.
34	-105.56	0.00	5772.69	190.85	1.00	51887942.
35	-114.44	0.00	5772.69	190.85	1.00	51887942.
36	-123.33	0.00	5772.69	190.85	1.00	51887942.
37	-132.22	0.00	5772.69	190.85	1.00	51887942.
38	-141.11	1000.00	5772.69	190.85	1.00	51887942.

PROB 2 42-IN, DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=,100,MINIMUM WALL THICKNESS=1,50 IN, RU = 35

TABLE B -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35,00

PERMANENT SET OF PILE = ,0418 INCHES
NUMBER OF BLOWS PER FOOT = 286,89
TOTAL INTERVALS = 208

SEG	ELEV FT	MAX C STRESS LBS/SQ,IN,	TIME N	MAX T STRESS LBS/SQ,IN,	TIME N	AREA SQ,IN,	DMAX(M) IN,	D(M) IN,	V(M) FT/SEC
1	0,00	4126428,	25	0,	208	1,000	1,393316	,657225	-15,54
2	0,00	3392390,	34	0,	208	1,000	,965021	,439798	-3,09
3	160,00	15587,	37	539,	208	221,286	,942807	,444089	-1,76
4	150,00	15795,	39	1154,	206	221,286	,931071	,446314	-1,67
5	140,00	15950,	42	1480,	208	221,286	,918988	,450592	-1,81
6	130,00	14073,	44	1282,	208	251,328	,907511	,456714	-1,86
7	121,67	14100,	46	964,	208	251,328	,899063	,461134	-1,74
8	113,33	14126,	48	564,	208	251,328	,890125	,464457	-1,60
9	105,00	14150,	50	233,	208	251,328	,881074	,466402	-1,46
10	96,67	14162,	52	0,	0	251,328	,873175	,467205	-1,34
11	88,33	14130,	54	0,	0	251,328	,867163	,466941	-1,25
12	80,00	14025,	56	0,	0	251,328	,861735	,465392	-1,14
13	71,67	13883,	58	0,	0	251,328	,856098	,462380	-,98
14	63,33	13742,	60	0,	0	251,328	,849638	,457982	-,82
15	55,00	13620,	63	0,	0	251,328	,841850	,452348	-,72
16	46,67	13540,	65	0,	0	251,328	,832381	,445821	-,65
17	38,33	13522,	67	0,	0	251,328	,821119	,438849	-,62
18	30,00	15462,	70	0,	0	221,286	,807972	,431545	-,61
19	21,67	15636,	72	0,	0	221,286	,791104	,423038	-,59
20	13,33	15879,	74	0,	0	221,286	,772084	,414358	-,57
21	5,00	16209,	77	0,	0	221,286	,750803	,405646	-,56
22	-3,33	16510,	79	0,	0	221,286	,727398	,397046	-,56
23	-11,67	16650,	81	0,	0	221,286	,702061	,388388	-,54
24	-20,00	16620,	83	0,	0	221,286	,674816	,379444	-,53
25	-28,33	16510,	86	0,	0	221,286	,645971	,369962	-,53
26	-36,67	16308,	88	0,	0	221,286	,615523	,359736	-,53
27	-45,00	15914,	90	0,	0	221,286	,583645	,348409	-,51
28	-53,33	15519,	93	0,	0	221,286	,550559	,335637	-,48
29	-61,67	15060,	95	0,	0	221,286	,516344	,321065	-,43
30	-70,00	16828,	98	0,	0	190,852	,480665	,304427	-,39
31	-78,89	16026,	100	0,	0	190,852	,434890	,281476	-,33
32	-87,78	15243,	104	0,	0	190,852	,387747	,256604	-,28
33	-96,67	14841,	107	0,	0	190,852	,340499	,230412	-,24
34	-105,56	14170,	107	0,	0	190,852	,294822	,203665	-,21
35	-114,44	13279,	109	0,	0	190,852	,250680	,177096	-,18
36	-123,33	12203,	113	0,	0	190,852	,208200	,151622	-,16
37	-132,22	11149,	113	0,	0	190,852	,172648	,128122	-,14
38	-141,11	9102,	115	0,	0	190,852	,141828	,107350	-,10

PROB 2 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.97	50.	63.79	15940.	5	14730.	30
2.66	100.	123.40	16331.	30	13339.	30
3.59	150.	179.07	16675.	30	12023.	30
4.60	200.	230.64	16709.	30	10760.	30
5.76	250.	278.67	16731.	30	9580.	30
6.86	300.	323.46	16747.	30	8468.	30
8.04	350.	365.26	16760.	30	7418.	30
9.26	400.	404.30	16776.	30	6427.	30
10.64	450.	440.76	16793.	30	5503.	30
12.17	500.	474.80	16807.	30	4630.	30
13.80	550.	506.57	16821.	30	3805.	30
15.13	600.	536.24	16833.	30	3024.	30
16.17	650.	564.00	16842.	30	2285.	30
17.29	700.	589.93	16852.	30	1582.	30
18.49	750.	614.18	16860.	30	926.	31
19.80	800.	636.84	16868.	30	310.	31
21.22	850.	657.98	16873.	30	0.	38
22.77	900.	677.73	16876.	30	0.	38
24.46	950.	696.20	16880.	30	0.	38
26.31	1000.	713.43	16882.	30	0.	38
28.35	1050.	729.49	16883.	30	0.	38
30.61	1100.	744.52	16888.	30	0.	38
33.10	1150.	758.50	16893.	30	0.	38
35.89	1200.	771.54	16896.	30	0.	38
39.00	1250.	783.63	16898.	30	0.	38
42.51	1300.	794.79	16899.	30	0.	38
46.47	1350.	804.99	16899.	30	0.	38
51.01	1400.	814.26	16899.	30	0.	38
56.19	1450.	822.46	16897.	30	0.	38
62.17	1500.	829.78	16894.	30	0.	38
69.20	1550.	836.22	16889.	30	0.	38
77.40	1600.	842.05	16884.	30	0.	38
87.25	1650.	847.40	16879.	30	0.	38
99.06	1700.	852.20	16871.	30	0.	38
113.65	1750.	856.67	16862.	30	251.	4
131.67	1800.	860.64	16853.	30	581.	4
155.00	1850.	864.19	16848.	30	850.	4
185.47	1900.	867.16	16842.	30	1141.	5
227.43	1950.	868.89	16836.	30	1373.	5
286.89	2000.	868.58	16828.	30	1480.	5
378.87	2050.	866.24	16819.	30	1524.	5

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PROB 2 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN.   RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
131.67	1800.
185.47	1900.
227.43	1950.
286.89	2000.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA .

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	6
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0

LENGTH OF FREE STANDING PILE(FT) 100.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	80.	230	310

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES		1
SIDE DAMPENING RESISTANCE	= JSIDE	.15
POINT DAMPENING RESISTANCE	= JPONT	.15
SOIL QUAKE FOR SIDE	= QSIDE	.10
SOIL QUAKE FOR POINT	= QPOINT	.30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5772.69	190.85	1.00	51887942.
31	-78.89	0.00	5772.69	190.85	1.00	51887942.
32	-87.78	0.00	5772.69	190.85	1.00	51887942.
33	-96.67	0.00	5772.69	190.85	1.00	51887942.
34	-105.56	0.00	5772.69	190.85	1.00	51887942.
35	-114.44	0.00	5772.69	190.85	1.00	51887942.
36	-123.33	0.00	5772.69	190.85	1.00	51887942.
37	-132.22	0.00	5772.69	190.85	1.00	51887942.
38	-141.11	1000.00	5772.69	190.85	1.00	51887942.

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0302 INCHES
NUMBER OF BLOWS PER FOOT = 397.50
TOTAL INTERVALS = 154

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4126428.	25	0.	120	1.000	1.419357	1.419357	-.06
2	0.00	3392390.	34	0.	0	1.000	.988904	.944808	-1.05
3	160.00	15587.	37	0.	0	221.286	.968665	.920011	-1.21
4	150.00	15795.	39	0.	0	221.286	.958855	.906220	-1.35
5	140.00	15950.	42	0.	0	221.286	.947865	.891561	-1.47
6	130.00	14073.	44	0.	0	251.328	.936172	.875943	-1.56
7	121.67	14100.	46	0.	0	251.328	.927487	.863980	-1.60
8	113.33	14126.	48	0.	0	251.328	.919023	.851600	-1.61
9	105.00	14150.	50	0.	0	251.328	.910274	.838781	-1.61
10	96.67	14162.	52	0.	0	251.328	.901057	.825426	-1.63
11	88.33	14130.	54	0.	0	251.328	.891719	.811329	-1.67
12	80.00	14025.	56	0.	0	251.328	.884891	.796170	-1.74
13	71.67	13883.	58	0.	0	251.328	.879359	.779811	-1.78
14	63.33	13742.	60	0.	0	251.328	.873636	.762454	-1.76
15	55.00	13619.	63	0.	0	251.328	.867275	.744452	-1.68
16	46.67	13537.	65	0.	0	251.328	.859872	.726194	-1.58
17	38.33	13512.	67	0.	0	251.328	.851359	.707868	-1.52
18	30.00	15419.	70	0.	0	221.286	.841662	.689274	-1.53
19	21.67	15543.	72	0.	0	221.286	.829401	.667638	-1.57
20	13.33	15710.	74	0.	0	221.286	.815806	.645502	-1.59
21	5.00	15922.	76	0.	0	221.286	.800902	.623255	-1.55
22	-3.33	16117.	79	0.	0	221.286	.784645	.601473	-1.45
23	-11.67	16201.	81	0.	0	221.286	.766772	.580355	-1.32
24	-20.00	16188.	83	0.	0	221.286	.747313	.559790	-1.16
25	-28.33	16013.	85	0.	0	221.286	.726151	.539655	-.97
26	-36.67	15833.	87	0.	0	221.286	.703509	.519779	-.80
27	-45.00	15542.	90	0.	0	221.286	.679851	.499784	-.70
28	-53.33	15266.	92	0.	0	221.286	.655946	.479477	-.60
29	-61.67	14958.	95	0.	0	221.286	.631627	.459140	-.46
30	-70.00	16044.	97	0.	0	190.852	.606082	.438944	-.38
31	-78.89	16342.	99	0.	0	190.852	.572634	.413869	-.32
32	-87.78	15453.	100	0.	0	190.852	.538624	.388877	-.24
33	-96.67	14502.	105	0.	0	190.852	.505532	.364164	-.24
34	-105.56	14232.	107	0.	0	190.852	.471617	.339627	-.25
35	-114.44	13565.	108	0.	0	190.852	.435866	.315389	-.25
36	-123.33	12678.	114	0.	0	190.852	.399344	.291495	-.28
37	-132.22	12430.	114	0.	0	190.852	.363298	.268370	-.33
38	-141.11	12003.	117	0.	0	190.852	.330189	.246414	-.42

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300, MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.86	50.	90.99	15942.	5	14603.	30
2.54	100.	175.78	16374.	30	13117.	30
3.43	150.	254.77	16729.	30	11717.	30
4.50	200.	327.77	16756.	30	10362.	30
5.86	250.	395.56	16773.	30	9126.	30
7.30	300.	458.70	16787.	30	7961.	30
8.96	350.	517.53	16798.	30	6845.	30
10.57	400.	572.34	16808.	30	5804.	30
12.51	450.	623.39	16817.	30	4822.	30
14.77	500.	670.96	16828.	30	3896.	30
17.22	550.	715.22	16840.	30	3026.	30
18.69	600.	756.50	16852.	30	2209.	30
20.29	650.	795.04	16863.	30	1445.	30
22.06	700.	831.22	16872.	30	908.	5
24.02	750.	865.10	16880.	30	66.	30
26.19	800.	896.89	16888.	30	0.	38
28.64	850.	926.64	16896.	30	0.	38
31.38	900.	954.30	16904.	30	0.	38
34.48	950.	979.99	16910.	30	0.	38
38.04	1000.	1003.85	16914.	30	0.	38
42.12	1050.	1026.10	16919.	30	0.	38
46.88	1100.	1046.53	16923.	30	0.	38
52.45	1150.	1064.33	16926.	30	0.	38
59.09	1200.	1080.30	16928.	30	0.	38
67.11	1250.	1095.97	16931.	30	0.	38
76.93	1300.	1115.51	16932.	30	0.	38
89.27	1350.	1131.28	16933.	30	0.	38
105.18	1400.	1147.60	16933.	30	0.	38
126.30	1450.	1165.35	16937.	30	0.	38
155.68	1500.	1171.03	16939.	30	0.	38
198.83	1550.	1168.43	16941.	30	0.	38
268.87	1600.	1159.41	16943.	30	0.	38
397.50	1650.	1145.41	16944.	30	0.	38

PROB 3 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
126.30	1450.
198.83	1550.
268.87	1600.
292.20	1612.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER
QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	42000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	7
NUMBER OF SECTIONS CHANGED	0
NUMBER OF SECTIONS ADDED	0
LENGTH OF FREE STANDING PILE(FT)	160.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES		1
SIDE DAMPENING RESISTANCE	= JSIDE	.15
POINT DAMPENING RESISTANCE	= JPONT	.15
SOIL QUAKE FOR SIDE	= QSIDE	.10
SOIL QUAKE FOR POINT	= QPOINT	.03

TIP RESISTANCE PERCENTAGE
10.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5411.90	190.85	1.00	55347138.
31	-78.33	0.00	5411.90	190.85	1.00	55347138.
32	-86.67	0.00	5411.90	190.85	1.00	55347138.
33	-95.00	0.00	5411.90	190.85	1.00	55347138.
34	-103.33	0.00	5411.90	190.85	1.00	55347138.
35	-111.67	0.00	5411.90	190.85	1.00	55347138.
36	-120.00	0.00	5772.69	190.85	1.00	51887942.
37	-128.89	0.00	5772.69	190.85	1.00	51887942.
38	-137.78	0.00	5772.69	190.85	1.00	51887942.
39	-146.67	0.00	5772.69	190.85	1.00	51887942.
40	-155.56	0.00	5772.69	190.85	1.00	51887942.
41	-164.44	0.00	5772.69	190.85	1.00	51887942.
42	-173.33	0.00	5772.69	190.85	1.00	51887942.
43	-182.22	0.00	5772.69	190.85	1.00	51887942.
44	-191.11	1000.00	5772.69	190.85	1.00	51887942.

PROB 4 42-IN. DIAMETER PILES HL=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0416 INCHES
NUMBER OF BLOWS PER FOOT = 288.33
TOTAL INTERVALS = 317

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4125848.	25	0.	317	1.000	1.405151	-3.837718	-15.54
2	0.00	3392672.	35	0.	317	1.000	.976154	-.334827	-2.40
3	160.00	15590.	37	845.	211	221.286	.954630	.164999	-.34
4	150.00	15798.	40	1326.	214	221.286	.943883	.165113	-.34
5	140.00	15955.	42	1465.	216	221.286	.932087	.165361	-.32
6	130.00	14071.	44	1280.	218	251.328	.920283	.165820	-.31
7	121.67	14093.	46	1288.	220	251.328	.911954	.166212	-.29
8	113.33	14123.	49	1413.	223	251.328	.903266	.166856	-.27
9	105.00	14152.	51	1410.	224	251.328	.894100	.167572	-.22
10	96.67	14167.	53	1210.	226	251.328	.885132	.168550	-.17
11	88.33	14133.	55	930.	228	251.328	.878069	.169816	-.11
12	80.00	14026.	57	823.	282	251.328	.872470	.171397	-.07
13	71.67	13888.	59	830.	286	251.328	.866975	.173338	-.05
14	63.33	13751.	61	835.	287	251.328	.860939	.175441	-.01
15	55.00	13621.	63	863.	289	251.328	.853868	.177857	.01
16	46.67	13535.	65	948.	306	251.328	.845447	.180626	.03
17	38.33	13523.	68	1094.	315	251.328	.835460	.183806	.04
18	30.00	15040.	70	1363.	311	221.286	.823960	.187508	.02
19	21.67	15587.	73	1505.	312	221.286	.809303	.192165	.01
20	13.33	15798.	75	1617.	308	221.286	.792758	.197122	.00
21	5.00	16064.	77	1743.	309	221.286	.774264	.202504	-.02
22	-3.33	16304.	80	1811.	308	221.286	.753853	.208277	-.05
23	-11.67	16414.	82	1805.	310	221.286	.731486	.214168	-.07
24	-20.00	16378.	84	1695.	311	221.286	.707187	.219986	-.11
25	-28.33	16263.	86	1496.	311	221.286	.680998	.225434	-.14
26	-36.67	16107.	89	1204.	313	221.286	.652944	.230267	-.19
27	-45.00	15820.	91	795.	315	221.286	.623082	.234136	-.23
28	-53.33	15520.	93	314.	317	221.286	.591536	.236797	-.26
29	-61.67	15233.	96	0.	0	221.286	.558384	.237881	-.26
30	-70.00	17186.	98	0.	0	190.852	.523903	.236993	-.25
31	-78.33	16619.	101	0.	0	190.852	.483612	.233339	-.22
32	-86.67	15973.	103	0.	0	190.852	.443685	.226907	-.21
33	-95.00	15220.	105	0.	0	190.852	.404131	.217458	-.17
34	-103.33	14384.	108	0.	0	190.852	.365575	.204703	-.09
35	-111.67	13454.	109	0.	0	190.852	.328094	.189215	-.01
36	-120.00	12429.	111	0.	0	190.852	.291421	.171899	.02
37	-128.89	11736.	114	0.	0	190.852	.252704	.152272	.05
38	-137.78	10968.	118	0.	0	190.852	.214625	.132259	.06
39	-146.67	10229.	120	0.	0	190.852	.177729	.112891	.03
40	-155.56	9183.	121	0.	0	190.852	.144570	.095089	-.01

42	-173.[illegible]	6160.	125	0.	0	[illegible]	.046701	.066347	-.06
43	-182.[illegible]	4861.	121	0.	0	[illegible]	.080154	.056585	-.09
44	-191.11	3882.	126	0.	153	[illegible]	.066620	.049954	-.10

PROB 4 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025, MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLO-S/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.01	50.	25.66	15947.	5	14649.	33
2.86	100.	49.76	16252.	30	13430.	33
3.87	150.	72.39	16665.	30	12276.	33
4.79	200.	93.51	16806.	30	11162.	34
5.53	250.	113.20	16836.	30	10201.	35
6.33	300.	131.60	16857.	30	9292.	35
7.21	350.	148.81	16875.	30	8424.	35
8.20	400.	164.88	16891.	30	7610.	36
9.32	450.	179.88	16911.	30	6867.	36
12.04	500.	193.48	16929.	30	6157.	36
12.80	550.	206.94	16947.	30	5491.	37
13.60	600.	219.10	16965.	30	4878.	37
14.47	650.	[illegible]	16980.	30	4286.	37
15.39	700.	244.96	16994.	30	3720.	37
16.37	750.	250.74	17008.	30	3174.	37
17.43	800.	259.93	17022.	30	2670.	38
18.58	850.	264.23	17036.	30	2210.	38
19.82	900.	275.01	17048.	30	1768.	38
21.16	950.	285.17	17058.	30	1337.	38
22.62	1000.	289.76	17068.	30	915.	38
24.20	1050.	295.80	17077.	30	499.	38
25.94	1100.	301.30	17086.	30	87.	38
27.64	1150.	305.53	17095.	30	0.	44
29.94	1200.	310.98	17103.	30	0.	44
32.25	1250.	315.16	17110.	30	0.	44
34.85	1300.	319.90	17116.	30	0.	44
37.68	1350.	322.19	17123.	30	0.	44
40.90	1400.	325.11	17132.	30	0.	44
44.47	1450.	327.69	17140.	30	0.	44
48.54	1500.	330.01	17147.	30	0.	44
53.13	1550.	332.15	17155.	30	0.	44
58.39	1600.	334.02	17162.	30	0.	44
64.39	1650.	[illegible]	17169.	30	0.	44
71.37	1700.	336.70	17175.	30	0.	44
79.45	1750.	337.16	17179.	30	0.	44
88.93	1800.	[illegible]	17182.	30	0.	44
100.01	1850.	337.49	17184.	30	0.	44
113.13	1900.	341.59	17185.	30	0.	44
128.46	1950.	345.43	17187.	30	0.	44
146.51	2000.	349.49	17188.	30	0.	44
165.71	2050.	353.61	17189.	30	0.	44
189.90	2100.	357.62	17190.	30	0.	44
216.91	2150.	362.10	17189.	30	1813.	23
249.24	2200.	366.37	17198.	30	1792.	22
288.33	2250.	[illegible]	17186.	30	1811.	22
335.36	2300.	[illegible]	17165.	30	1828.	22

PROB 4 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.025,MINIMUM WALL THICKNESS=1.50 IN. RU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
128.46	1950.
189.90	2100.
249.24	2200.
288.33	2250.

WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

PROB
5   42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
     200FT PENETRATION -- VULCAN 560 HAMMER
     QTIP=.100, MINIMUM WALL THICKNESS=1.50 IN.   RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 560 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	300000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	60000.00	1.00	.60	6200000.00
2	1000.00	62000.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TUD)	UNIT WT. (PCF)	MODULUS (PSI)
1	42.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS	7
NUMBER OF SECTIONS CHANGED	0

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATIC NUMBER TOP	STATIC NUMBER BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPONT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE
35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 5 42-IN. DIAMETER PILES HL=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100, MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5411.90	190.85	1.00	55347138.
31	-78.33	0.00	5411.90	190.85	1.00	55347138.
32	-86.67	0.00	5411.90	190.85	1.00	55347138.
33	-95.00	0.00	5411.90	190.85	1.00	55347138.
34	-103.33	0.00	5411.90	190.85	1.00	55347138.
35	-111.67	0.00	5411.90	190.85	1.00	55347138.
36	-120.00	0.00	5772.69	190.85	1.00	51887942.
37	-128.89	0.00	5772.69	190.85	1.00	51887942.
38	-137.78	0.00	5772.69	190.85	1.00	51887942.
39	-146.67	0.00	5772.69	190.85	1.00	51887942.
40	-155.56	0.00	5772.69	190.85	1.00	51887942.
41	-164.44	0.00	5772.69	190.85	1.00	51887942.
42	-173.33	0.00	5772.69	190.85	1.00	51887942.
43	-182.22	0.00	5772.69	190.85	1.00	51887942.
44	-191.11	1000.00	5772.69	190.85	1.00	51887942.

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0397 INCHES
NUMBER OF BLOWS PER FOOT = 302.55
TOTAL INTERVALS = 157

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4125848.	25	0.	122	1.000	1.427510	1.427510	-.00
2	0.00	3392672.	35	0.	0	1.000	.995989	.960912	-.87
3	160.00	15590.	37	0.	0	221.286	.976685	.936545	-1.05
4	150.00	15798.	40	0.	0	221.286	.967866	.923121	-1.24
5	140.00	15955.	42	0.	0	221.286	.957939	.908703	-1.43
6	130.00	14071.	44	0.	0	251.328	.946941	.893039	-1.58
7	121.67	14093.	46	0.	0	251.328	.938353	.880719	-1.70
8	113.33	14123.	49	0.	0	251.328	.929526	.867561	-1.80
9	105.00	14152.	51	0.	0	251.328	.920902	.853551	-1.87
10	96.67	14167.	53	0.	0	251.328	.912101	.838757	-1.91
11	88.33	14133.	55	0.	0	251.328	.902832	.823240	-1.94
12	80.00	14026.	57	0.	0	251.328	.893287	.807015	-1.93
13	71.67	13888.	59	0.	0	251.328	.886432	.790128	-1.90
14	63.33	13751.	61	0.	0	251.328	.880854	.772628	-1.85
15	55.00	13621.	63	0.	0	251.328	.874908	.754591	-1.78
16	46.67	13533.	66	0.	0	251.328	.866278	.736145	-1.70
17	38.33	13514.	68	0.	0	251.328	.860787	.717418	-1.62
18	30.00	15412.	70	0.	0	221.286	.852283	.698578	-1.55
19	21.67	15511.	73	0.	0	221.286	.841526	.677197	-1.46
20	13.33	15663.	75	0.	0	221.286	.829659	.655873	-1.41
21	5.00	15851.	77	0.	0	221.286	.816646	.634607	-1.40
22	-3.33	16012.	79	0.	0	221.286	.802184	.613386	-1.41
23	-11.67	16065.	81	0.	0	221.286	.786126	.592089	-1.43
24	-20.00	15992.	84	0.	0	221.286	.768339	.570525	-1.40
25	-28.33	15875.	86	0.	0	221.286	.748638	.548735	-1.30
26	-36.67	15720.	88	0.	0	221.286	.726988	.526799	-1.16
27	-45.00	15475.	90	0.	0	221.286	.703410	.504717	-1.00
28	-53.33	15272.	93	0.	0	221.286	.678006	.482542	-.89
29	-61.67	15073.	95	0.	0	221.286	.651047	.460115	-.82
30	-70.00	17192.	98	0.	0	190.852	.622859	.437355	-.75
31	-78.33	16836.	100	0.	0	190.852	.589489	.410572	-.67
32	-86.67	16421.	102	0.	0	190.852	.556000	.383784	-.54
33	-95.00	15936.	104	0.	0	190.852	.522363	.357529	-.40
34	-103.33	15397.	107	0.	0	190.852	.489323	.331683	-.37
35	-111.67	14770.	109	0.	0	190.852	.456658	.305774	-.43
36	-120.00	14159.	111	0.	0	190.852	.423980	.279500	-.46
37	-128.89	13471.	113	0.	0	190.852	.387740	.251584	-.45
38	-137.78	12752.	116	0.	0	190.852	.349688	.224107	-.48
39	-146.67	12481.	120	0.	0	190.852	.310886	.197545	-.45
40	-155.56	12294.	121	0.	0	190.852	.273131	.172469	-.43

127	0.	0	19 52	.199528	.128091	-.40
128	0.	0	19 52	.168095	.109725	-.39
129	0.	0	19 52	.139662	.094243	-.41

PROB 5 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.83	50.	63.98	15949.	5	14473.	32
2.64	100.	123.83	16282.	30	13114.	33
3.74	150.	179.89	16775.	30	11846.	33
4.79	200.	231.82	16849.	30	10613.	33
5.75	250.	280.13	16869.	30	9463.	35
6.63	300.	325.18	16885.	30	8446.	35
7.69	350.	367.18	16899.	30	7482.	35
8.86	400.	406.34	16912.	30	6569.	35
10.20	450.	442.85	16925.	30	5712.	36
12.98	500.	476.86	16935.	30	4929.	36
13.89	550.	508.56	16949.	30	4185.	36
14.87	600.	538.08	16964.	30	3480.	36
15.93	650.	565.57	16978.	30	2813.	36
17.07	700.	591.15	16990.	30	2187.	37
18.30	750.	614.93	17003.	30	1605.	37
19.64	800.	637.05	17015.	30	1045.	37
21.10	850.	657.58	17027.	30	509.	37
22.70	900.	676.63	17039.	30	0.	44
24.46	950.	694.30	17050.	30	0.	44
26.39	1000.	710.66	17061.	30	0.	44
28.54	1050.	725.80	17070.	30	0.	44
30.92	1100.	739.81	17079.	30	0.	44
33.59	1150.	752.70	17087.	30	0.	44
36.58	1200.	764.57	17096.	30	0.	44
39.96	1250.	775.46	17104.	30	0.	44
43.81	1300.	785.33	17112.	30	0.	44
48.20	1350.	794.16	17120.	30	0.	44
53.29	1400.	802.16	17127.	30	0.	44
59.17	1450.	809.49	17134.	30	0.	44
66.11	1500.	815.80	17141.	30	0.	44
74.28	1550.	821.16	17147.	30	0.	44
84.18	1600.	825.66	17152.	30	0.	44
96.12	1650.	829.50	17156.	30	0.	44
111.04	1700.	832.98	17161.	30	0.	44
129.85	1750.	836.14	17165.	30	0.	44
154.52	1800.	838.93	17172.	30	0.	44
187.45	1850.	841.11	17179.	30	0.	44
234.17	1900.	841.90	17185.	30	0.	44
302.55	1950.	840.56	17192.	30	0.	44

PROB 5 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.100,MINIMUM WALL THICKNESS=1.50 IN. RU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
129.85	1750.
187.45	1850.
234.17	1900.
302.55	1950.

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WAVE EQUATION ANALYSIS FOR 42-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- BORING SITES 3A + 4
8 JUNE 1976

 PROB
   6       42-IN. DIAMETER PILES  MLW=105FT 3-PILE STRUCTURES
           200FT PENETRATION -- VULCAN 560 HAMMER
           QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN.   RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                           1
     NEW HAMMER DATA OPTION              1
     NEW MATERIAL DATA OPTION            1
     NEW PILE SECTION DATA OPTION        1
     NEW SOIL DATA OPTION                1
     SPECIFIED BLOW COUNT OPTION         1
     OUTPUT OPTION FOR STRESS            1
     BPF FOR STRESS OUTPUT OPTION                   275.
     ULTIMATE RESISTANCE INCREMENT (TONS)           50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)      300.
     SPECIFIED SEGMENT LENGTH (FT)                  -0.00


TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION              VULCAN 560 HAMMER
     HAMMER EFFICIENCY                         .75
     HAMMER ENERGY (FT-LBS)              300000.00
     HAMMER EXPLOSIVE FORCE (LBS)            -0.00
     NUMBER OF HAMMER SEGMENTS                   2

     SEGMENT      SLACK       WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER      (IN)        (LB)      (SQ IN) RESTITUTION     (LB / IN)

         1        1000.00  60000.00      1.00        .60       6200000.00
         2        1000.00  42000.00      1.00        .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL      (TOD)   UNIT WT.   MODULUS
           TYPE                 (PCF)      (PSI)

             1         42.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS         7
     NUMBER OF SECTIONS CHANGED            0
     NUMBER OF SECTIONS ADDED              0
```

S ION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATI. NUMBER TOP	BOTTOM
1	1	1.750	30.	0	30
2	1	2.000	50.	30	80
3	1	2.000	50.	80	130
4	1	1.750	50.	130	180
5	1	1.750	50.	180	230
6	1	1.500	50.	230	280
7	1	1.500	80.	280	360

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES	1
SIDE DAMPENING RESISTANCE = JSIDE	.15
POINT DAMPENING RESISTANCE = JPONT	.15
SOIL QUAKE FOR SIDE = QSIDE	.10
SOIL QUAKE FOR POINT = QPOINT	.30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 6 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	60000.00	1.00	.60	6200000.
2	0.00	1000.00	42000.00	1.00	.90	53477559.
3	160.00	0.00	7529.89	221.29	1.00	53477559.
4	150.00	0.00	7529.89	221.29	1.00	53477559.
5	140.00	0.00	7529.89	221.29	1.00	53477559.
6	130.00	0.00	7126.78	251.33	1.00	72885120.
7	121.67	0.00	7126.78	251.33	1.00	72885120.
8	113.33	0.00	7126.78	251.33	1.00	72885120.
9	105.00	0.00	7126.78	251.33	1.00	72885120.
10	96.67	0.00	7126.78	251.33	1.00	72885120.
11	88.33	0.00	7126.78	251.33	1.00	72885120.
12	80.00	0.00	7126.78	251.33	1.00	72885120.
13	71.67	0.00	7126.78	251.33	1.00	72885120.
14	63.33	0.00	7126.78	251.33	1.00	72885120.
15	55.00	0.00	7126.78	251.33	1.00	72885120.
16	46.67	0.00	7126.78	251.33	1.00	72885120.
17	38.33	0.00	7126.78	251.33	1.00	72885120.
18	30.00	0.00	6274.91	221.29	1.00	64173070.
19	21.67	0.00	6274.91	221.29	1.00	64173070.
20	13.33	0.00	6274.91	221.29	1.00	64173070.
21	5.00	0.00	6274.91	221.29	1.00	64173070.
22	-3.33	0.00	6274.91	221.29	1.00	64173070.
23	-11.67	0.00	6274.91	221.29	1.00	64173070.
24	-20.00	0.00	6274.91	221.29	1.00	64173070.
25	-28.33	0.00	6274.91	221.29	1.00	64173070.
26	-36.67	0.00	6274.91	221.29	1.00	64173070.
27	-45.00	0.00	6274.91	221.29	1.00	64173070.
28	-53.33	0.00	6274.91	221.29	1.00	64173070.
29	-61.67	0.00	6274.91	221.29	1.00	64173070.
30	-70.00	0.00	5411.90	190.85	1.00	55347138.
31	-78.33	0.00	5411.90	190.85	1.00	55347138.
32	-86.67	0.00	5411.90	190.85	1.00	55347138.
33	-95.00	0.00	5411.90	190.85	1.00	55347138.
34	-103.33	0.00	5411.90	190.85	1.00	55347138.
35	-111.67	0.00	5411.90	190.85	1.00	55347138.
36	-120.00	0.00	5772.69	190.85	1.00	51887942.
37	-128.89	0.00	5772.69	190.85	1.00	51887942.
38	-137.78	0.00	5772.69	190.85	1.00	51887942.
39	-146.67	0.00	5772.69	190.85	1.00	51887942.
40	-155.56	0.00	5772.69	190.85	1.00	51887942.
41	-164.44	0.00	5772.69	190.85	1.00	51887942.
42	-173.33	0.00	5772.69	190.85	1.00	51887942.
43	-182.22	0.00	5772.69	190.85	1.00	51887942.
44	-191.11	1000.00	5772.69	190.85	1.00	51887942.

PROB 6 42-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0399 INCHES
NUMBER OF BLOWS PER FOOT = 300.89
TOTAL INTERVALS = 165

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	4125848.	25	0.	123	1.000	1.461576	1.461576	-.02
2	0.00	3392672.	35	0.	0	1.000	1.025657	1.010818	-.47
3	160.00	15590.	37	0.	0	221.286	1.008634	.986729	-.66
4	150.00	15798.	40	0.	0	221.286	1.002836	.973746	-.84
5	140.00	15955.	42	0.	0	221.286	.996315	.959972	-1.03
6	130.00	14071.	44	0.	0	251.328	.989033	.945485	-1.20
7	121.67	14093.	46	0.	0	251.328	.982986	.934485	-1.31
8	113.33	14123.	49	0.	0	251.328	.976111	.923112	-1.40
9	105.00	14152.	51	0.	0	251.328	.968388	.911335	-1.46
10	96.67	14167.	53	0.	0	251.328	.959940	.899186	-1.51
11	88.33	14133.	55	0.	0	251.328	.950962	.886706	-1.54
12	80.00	14026.	57	0.	0	251.328	.941741	.873932	-1.54
13	71.67	13888.	59	0.	0	251.328	.932709	.860938	-1.51
14	63.33	13751.	61	0.	0	251.328	.923455	.847807	-1.45
15	55.00	13621.	63	0.	0	251.328	.913706	.834637	-1.35
16	46.67	13531.	66	0.	0	251.328	.903761	.821476	-1.23
17	38.33	13508.	68	0.	0	251.328	.895941	.808256	-1.13
18	30.00	15392.	70	0.	0	221.286	.889968	.794807	-1.06
19	21.67	15461.	72	0.	0	221.286	.882875	.779023	-1.02
20	13.33	15567.	75	0.	0	221.286	.875201	.762431	-1.03
21	5.00	15698.	77	0.	0	221.286	.866615	.744959	-1.05
22	-3.33	15806.	79	0.	0	221.286	.856934	.726855	-1.02
23	-11.67	15824.	81	0.	0	221.286	.845934	.708489	-.95
24	-20.00	15731.	83	0.	0	221.286	.833405	.690140	-.90
25	-28.33	15575.	85	0.	0	221.286	.819306	.671821	-.92
26	-36.67	15425.	88	0.	0	221.286	.803375	.653153	-1.00
27	-45.00	15222.	90	0.	0	221.286	.785587	.633787	-1.10
28	-53.33	15048.	92	0.	0	221.286	.766090	.613599	-1.15
29	-61.67	14920.	95	0.	0	221.286	.745152	.592809	-1.09
30	-70.00	17136.	97	0.	0	190.852	.722997	.571819	-.98
31	-78.33	16914.	99	0.	0	190.852	.696895	.547455	-.86
32	-86.67	16657.	102	0.	0	190.852	.670518	.523259	-.76
33	-95.00	16362.	104	0.	0	190.852	.644729	.499343	-.70
34	-103.33	16019.	106	0.	0	190.852	.620713	.475620	-.71
35	-111.67	15618.	108	0.	0	190.852	.598301	.451948	-.74
36	-120.00	15206.	110	0.	0	190.852	.575365	.428448	-.72
37	-128.89	14655.	112	0.	0	190.852	.549215	.403996	-.71
38	-137.78	13835.	114	0.	0	190.852	.522307	.380145	-.72
39	-146.67	12941.	117	0.	0	190.852	.495576	.356990	-.71
40	-155.56	12759.	121	0.	0	190.852	.467213	[illegible]	[illegible]

42	-17[illegible]	11[illegible].	127	0.	0	1[illegible]852	.403082	.292[illegible]5	-.80
43	-186[illegible]	12054.	129	0.	0	1[illegible]52	.370670	.272308	-.85
44	-191.[illegible]	12002.	131	0.	0	19[illegible].892	.339882	.253602	-.90

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.65	50.	91.22	15950.	5	14355.	32
2.33	100.	176.32	16307.	32	12888.	33
3.32	150.	255.82	16807.	30	11534.	33
4.55	200.	329.29	16875.	30	10208.	33
5.80	250.	397.45	16891.	30	9002.	33
7.10	300.	460.87	16904.	30	7908.	35
8.49	350.	519.96	16916.	30	6881.	35
10.03	400.	574.99	16926.	30	5907.	35
11.86	450.	626.21	16936.	30	4990.	35
15.33	500.	673.81	16945.	30	4125.	35
16.66	550.	718.08	16954.	30	3314.	35
18.11	600.	759.21	16963.	30	2566.	35
19.71	650.	797.48	16972.	30	1900.	7
21.47	700.	833.06	16983.	30	1375.	7
23.42	750.	866.31	16993.	30	596.	35
25.60	800.	897.31	17003.	30	27.	36
28.04	850.	926.36	17014.	30	1.	6
30.79	900.	953.52	17024.	30	0.	6
33.94	950.	978.93	17034.	30	0.	6
37.52	1000.	1002.40	17044.	30	0.	44
41.69	1050.	1024.02	17053.	30	0.	44
46.55	1100.	1043.50	17062.	30	0.	44
52.27	1150.	1060.53	17071.	30	0.	44
59.17	1200.	1075.55	17078.	30	0.	44
67.51	1250.	1089.02	17086.	30	0.	44
77.89	1300.	1106.96	17093.	30	0.	44
91.01	1350.	1122.37	17101.	30	0.	44
108.19	1400.	1135.13	17108.	30	0.	44
131.42	1450.	1151.67	17115.	30	0.	44
164.52	1500.	1159.53	17122.	30	0.	44
215.06	1550.	1157.45	17129.	30	0.	44
300.89	1600.	1145.34	17136.	30	0.	44

PROB 6 42-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
200FT PENETRATION -- VULCAN 560 HAMMER

QTIP=.300,MINIMUM WALL THICKNESS=1.50 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
131.42	1450.
215.06	1550.
244.35	1570.
300.89	1600.

Pile Driving Resistance Curves - Insert Piling

Pile Diameter	- 33 in.
Minimum Wall Thickness	-1.00 in.
Penetration	- 75 ft.
	- 150 ft.
Hammer	- Vulcan 040
Quake Factor, Tip	-.025 in.
	- .10 in.
	- .30 in.

6 0 0 0 R E M O T E B A T C H

UNITED COMPUTING 67. APEX/SL 8.7.0

15.47.05. 08/25/76.

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PPPPPPPPPPP  UU        UU  YY        YY     111      EEEEEEEEEEEE YY        YY  SSSSSSSSSS
PPPPPPPPPPPP UU        UU  YY        YY    1111      EEEEEEEEEEEE YY        YY SSSSSSSSSSSS
PP        PP UU        UU  YY        YY   1 11       EE           YY        YY SS        S
PP        PP UU        UU  YY        YY     11       EE           YY        YY SS
PP        PP UU        UU  YY        YY     11       EE           YY        YY SS
PP        PP UU        UU  YY        YY     11       EE           YY        YY SS
PPPPPPPPPPPP UU        UU  YYY      YYY     11       EE           YYY      YYY SS
PPPPPPPPPPP  UU        UU   YYY    YYY      11       EEEEEEEE      YYY    YYY  SSSSSSSSSSS
PP           UU        UU    YYY  YYY       11       EEEEEEEE       YYY  YYY    SSSSSSSSSSS
PP           UU        UU     YYYY          11       EE              YYYY                SS
PP           UU        UU      YY           11       EE               YY                 SS
PP           UU        UU      YY           11       EE               YY                 SS
PP           UU        UU      YY           11       EE               YY                 SS
PP           UU        UU      YY           11       EE               YY       S         SS
PP           UUUUUUUUUUUU      YY      111111111111  EEEEEEEEEEEE     YY       SSSSSSSSSSSS
PP            UUUUUUUUUU       YY      111111111111  EEEEEEEEEEEE     YY        SSSSSSSSSS
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WAVE EQUATION ANALYSIS FOR 33-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 AUGUST 1976

PROB
1   33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
       75 FT PENETRATION -- VULCAN 040 HAMMER
       QTIP=.025,UNIFORM WALL THICKNESS=1.00 IN.   RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	500.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 040 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	120000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	40000.00	1.00	.60	2780000.00
2	1000.00	27800.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	33.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

TOTAL NUMBER OF PILE SECTIONS 8

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE - JSIDE .15
POINT DAMPENING RESISTANCE - JPOINT .15
SOIL QUAKE FOR SIDE - QSIDE .10
SOIL QUAKE FOR POINT - QPOINT .03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 1 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.025,UNIFORM WALL THICKNESS=1.00 IN. RU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	40000.00	1.00	.60	2780000.
2	0.00	1000.00	27800.00	1.00	.90	24295040.
3	360.00	0.00	3420.65	100.53	1.00	24295040.
4	350.00	0.00	3420.65	100.53	1.00	24295040.
5	340.00	0.00	3420.65	100.53	1.00	24295040.
6	330.00	0.00	2850.71	100.53	1.00	29154048.
7	321.67	0.00	2850.71	100.53	1.00	29154048.
8	313.33	0.00	2850.71	100.53	1.00	29154048.
9	305.00	0.00	2850.71	100.53	1.00	29154048.
10	296.67	0.00	2850.71	100.53	1.00	29154048.
11	288.33	0.00	2850.71	100.53	1.00	29154048.
12	280.00	0.00	2850.71	100.53	1.00	29154048.
13	271.67	0.00	2850.71	100.53	1.00	29154048.
14	263.33	0.00	2850.71	100.53	1.00	29154048.
15	255.00	0.00	2850.71	100.53	1.00	29154048.
16	246.67	0.00	2850.71	100.53	1.00	29154048.
17	238.33	0.00	2850.71	100.53	1.00	29154048.
18	230.00	0.00	2850.71	100.53	1.00	29154048.
19	221.67	0.00	2850.71	100.53	1.00	29154048.
20	213.33	0.00	2850.71	100.53	1.00	29154048.
21	205.00	0.00	2850.71	100.53	1.00	29154048.
22	196.67	0.00	2850.71	100.53	1.00	29154048.
23	188.33	0.00	2850.71	100.53	1.00	29154048.
24	180.00	0.00	2932.16	100.53	1.00	28344213.
25	171.43	0.00	2932.16	100.53	1.00	28344213.
26	162.86	0.00	2932.16	100.53	1.00	28344213.
27	154.29	0.00	2932.16	100.53	1.00	28344213.
28	145.71	0.00	2932.16	100.53	1.00	28344213.
29	137.14	0.00	2932.16	100.53	1.00	28344213.
30	128.57	0.00	2932.16	100.53	1.00	28344213.
31	120.00	0.00	2932.16	100.53	1.00	28344213.
32	111.43	0.00	2932.16	100.53	1.00	28344213.
33	102.86	0.00	2932.16	100.53	1.00	28344213.
34	94.29	0.00	2932.16	100.53	1.00	28344213.
35	85.71	0.00	2932.16	100.53	1.00	28344213.
36	77.14	0.00	2932.16	100.53	1.00	28344213.
37	68.57	0.00	2932.16	100.53	1.00	28344213.
38	60.00	0.00	2932.16	100.53	1.00	28344213.
39	51.43	0.00	2932.16	100.53	1.00	28344213.
40	42.86	0.00	2932.16	100.53	1.00	28344213.
41	34.29	0.00	2932.16	100.53	1.00	28344213.
42	25.71	0.00	2932.16	100.53	1.00	28344213.
43	17.14	0.00	2932.16	100.53	1.00	28344213.
44	8.57	0.00	2932.16	100.53	1.00	28344213.
45	-.00	0.00	2850.71	100.53	1.00	29154048.
46	-8.33	0.00	2850.71	100.53	1.00	29154048.

48	-25.00	0.00	2850.71	100.53	1.00	29154048.
49	-33.33	0.00	2850.71	100.53	[illegible]	29154048.
50	-41.67	0.00	2850.71	100.53	1	29154048.
51	-50.00	0.00	2850.71	100.53	1.	29154048.
52	-58.33	0.00	2850.71	100.53	1.00	29154048.
53	-66.67	1000.00	2850.71	100.53	1.00	29154048.

PROB 1 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

UTIP=.025,UNIFORM WALL THICKNESS=1.00 IN. RU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0421 INCHES
NUMBER OF BLOWS PER FOOT = 284.66
TOTAL INTERVALS = 333

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1728012.	28	0.	333	1.000	1.692399	-.978073	-12.04
2	0.00	1262290.	39	0.	333	1.000	1.286611	.173333	-2.21
3	360.00	12597.	41	305.	261	100.531	1.264358	.209848	-1.84
4	350.00	12632.	43	443.	283	100.531	1.255734	.210464	-1.83
5	340.00	12693.	46	452.	333	100.531	1.248389	.211783	-1.83
6	330.00	12721.	46	555.	333	100.531	1.241615	.213568	-1.79
7	321.67	12748.	50	605.	333	100.531	1.236325	.215482	-1.79
8	313.33	12776.	52	690.	333	100.531	1.231177	.217567	-1.76
9	305.00	12804.	54	740.	333	100.531	1.226094	.219946	-1.73
10	296.67	12832.	56	741.	333	100.531	1.220948	.222499	-1.70
11	288.33	12860.	58	806.	333	100.531	1.215583	.225052	-1.65
12	280.00	12889.	60	795.	333	100.531	1.209799	.227830	-1.64
13	271.67	12917.	62	752.	333	100.531	1.203462	.230566	-1.59
14	263.33	12946.	64	741.	333	100.531	1.196363	.233090	-1.52
15	255.00	12976.	66	725.	333	100.531	1.188394	.235643	-1.52
16	246.67	13004.	68	642.	333	100.531	1.179394	.238143	-1.48
17	238.33	13037.	70	570.	332	100.531	1.169197	.240355	-1.43
18	230.00	13066.	72	614.	313	100.531	1.157696	.242310	-1.41
19	221.67	13095.	74	727.	315	100.531	1.144861	.244216	-1.40
20	213.33	13123.	76	815.	317	100.531	1.130782	.245919	-1.37
21	205.00	13151.	78	858.	319	100.531	1.115427	.247325	-1.35
22	196.67	13178.	80	879.	320	100.531	1.099585	.248737	-1.37
23	188.33	13204.	82	879.	322	100.531	1.083109	.250167	-1.40
24	180.00	13233.	84	858.	325	100.531	1.066563	.251482	-1.40
25	171.43	13263.	86	817.	326	100.531	1.050232	.252592	-1.41
26	162.86	13291.	88	765.	328	100.531	1.034627	.253620	-1.47
27	154.29	13320.	90	666.	330	100.531	1.019523	.255078	-1.61
28	145.71	13348.	92	559.	332	100.531	1.005766	.256924	-1.74
29	137.14	13375.	94	380.	333	100.531	.992036	.256846	-1.81
30	128.57	13402.	96	123.	333	100.531	.978528	.260222	-1.81
31	120.00	13429.	98	0.	0	100.531	.964064	.260657	-1.75
32	111.43	13457.	101	0.	0	100.531	.948725	.259712	-1.66
33	102.86	13486.	103	0.	0	100.531	.931795	.257330	-1.58
34	94.29	13516.	105	0.	0	100.531	.912995	.253744	-1.56
35	85.71	13544.	107	0.	0	100.531	.891756	.249144	-1.57
36	77.14	13572.	109	0.	0	100.531	.867590	.243677	-1.61
37	68.57	13601.	111	0.	0	100.531	.840306	.237452	-1.67
38	60.00	13644.	113	0.	0	100.531	.809619	.230669	-1.75
39	51.43	13735.	118	0.	0	100.531	.774945	.223362	-1.81

PROB 1 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

QTIP=.025,UNIFORM WALL THICKNESS=1.00 IN. NU = 14

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0421 INCHES
NUMBER OF BLOWS PER FOOT = 284.86
TOTAL INTERVALS = 333

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1720012.	28	0.	333	1.000	1.692399	-.978073	-12.04
2	0.00	1262290.	39	0.	333	1.000	1.286611	.173333	-2.21
3	360.00	12597.	41	305.	281	100.531	1.264358	.209848	-1.84
4	350.00	12632.	43	443.	283	100.531	1.255734	.210464	-1.83
5	340.00	12693.	46	432.	333	100.531	1.248389	.211783	-1.83
6	330.00	12721.	48	555.	333	100.531	1.241615	.213568	-1.79
7	321.67	12748.	50	605.	333	100.531	1.236325	.215482	-1.79
8	313.33	12776.	52	690.	333	100.531	1.231177	.217567	-1.76
9	305.00	12804.	54	740.	333	100.531	1.226094	.219946	-1.73
10	296.67	12832.	56	741.	333	100.531	1.220948	.222499	-1.70
11	288.33	12860.	58	806.	333	100.531	1.215583	.225052	-1.65
12	280.00	12889.	60	795.	333	100.531	1.209799	.227830	-1.64
13	271.67	12917.	62	732.	333	100.531	1.203462	.230566	-1.59
14	263.33	12946.	64	741.	333	100.531	1.196363	.233090	-1.52
15	255.00	12976.	66	725.	333	100.531	1.188394	.235643	-1.52
16	246.67	13008.	68	642.	333	100.531	1.179394	.238143	-1.48
17	238.33	13037.	70	570.	332	100.531	1.169197	.240355	-1.43
18	230.00	13066.	72	614.	313	100.531	1.157696	.242310	-1.41
19	221.67	13095.	74	727.	315	100.531	1.144861	.244216	-1.40
20	213.33	13123.	76	615.	317	100.531	1.130782	.245919	-1.37
21	205.00	13151.	78	858.	319	100.531	1.115627	.247325	-1.35
22	196.67	13178.	80	879.	320	100.531	1.099585	.248737	-1.37
23	188.33	13204.	82	879.	322	100.531	1.083109	.250167	-1.40
24	180.00	13233.	84	858.	325	100.531	1.066683	.251482	-1.40
25	171.43	13263.	86	817.	326	100.531	1.050232	.252592	-1.41
26	162.86	13291.	88	765.	328	100.531	1.034627	.253620	-1.47
27	154.29	13320.	90	666.	330	100.531	1.019823	.255078	-1.61
28	145.71	13348.	92	559.	332	100.531	1.005766	.256924	-1.74
29	137.14	13375.	94	388.	333	100.531	.992036	.258846	-1.81
30	128.57	13402.	96	125.	333	100.531	.978328	.260222	-1.81
31	120.00	13429.	98	0.	0	100.531	.964064	.260657	-1.75
32	111.43	13457.	101	0.	0	100.531	.948725	.259712	-1.66
33	102.86	13486.	103	0.	0	100.531	.931795	.257330	-1.58
34	94.29	13516.	105	0.	0	100.531	.912995	.253744	-1.56
35	85.71	13544.	107	0.	0	100.531	.891756	.249144	-1.57
36	77.14	13572.	109	0.	0	100.531	.867590	.243677	-1.61
37	68.57	13601.	111	0.	0	100.531	.840306	.237452	-1.67
38	60.00	13644.	113	0.	0	100.531	.809619	.230669	-1.75
39	[illegible]	[illegible]	[illegible]	0.	0	100.531	.77[illegible]	[illegible]	-1.81

40	42.[illegible]	1[illegible]12.	119	0.	0	[illegible]	.736162	.215522	-1.85
41	34.[illegible]	14735.	123	0.	0	[illegible]	.693347	.207126	-1.84
42	25.7	15884.	127	0.	0	100[illegible]1	.645897	.198185	-1.79
43	17.1	17208.	129	0.	0	100.[illegible]1	.593368	.188656	-1.70
44	8.57	18556.	132	0.	0	100.531	.536308	.178567	-1.57
45	-.00	19830.	132	0.	0	100.531	.474187	.168005	-1.41
46	-8.33	20501.	135	0.	0	100.531	.410316	.157378	-1.22
47	-16.67	20126.	135	0.	0	100.531	.344823	.145306	-1.01
48	-25.00	18750.	137	0.	0	100.531	.280541	.129576	-.79
49	-33.33	16590.	139	0.	0	100.531	.220514	.109990	-.59
50	-41.67	13712.	141	0.	0	100.531	.157007	.088521	-.41
51	-50.00	10162.	144	0.	0	100.531	.122369	.068226	-.28
52	-58.33	6633.	145	0.	0	100.531	.088619	.052718	-.18
53	-66.67	3800.	138	0.	300	100.531	.067127	.044633	-.10

PROB 1 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

QTIP=.025, UNIFORM WALL THICKNESS=1.00 IN. NU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.37	50.	21.09	13108.	43	9571.	10
4.14	100.	39.27	13695.	43	7758.	9
6.05	150.	55.07	14219.	44	5836.	8
8.80	200.	68.90	14546.	45	4225.	7
12.59	250.	81.08	14908.	45	2912.	6
14.70	300.	91.87	15275.	45	636.	5
17.00	350.	101.44	15715.	46	0.	53
19.68	400.	109.96	16183.	46	0.	53
22.70	450.	117.56	16643.	46	0.	53
26.21	500.	124.36	17072.	46	0.	53
30.33	550.	130.52	17490.	46	0.	53
35.19	600.	136.06	17873.	46	0.	53
40.99	650.	140.94	18220.	46	0.	53
47.99	700.	145.17	18564.	46	0.	53
56.56	750.	148.87	18673.	46	0.	53
67.16	800.	152.07	19152.	46	0.	53
80.45	850.	154.56	19400.	46	0.	53
97.31	900.	156.29	19642.	46	0.	53
118.65	950.	160.36	19851.	46	0.	53
145.09	1000.	166.08	20033.	46	0.	53
172.96	1050.	172.44	20179.	46	0.	53
205.06	1100.	178.81	20298.	46	0.	53
241.80	1150.	185.07	20405.	46	882.	23
284.86	1200.	191.02	20501.	46	879.	23
339.95	1250.	196.66	20585.	46	904.	23

PROB 1 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.025,UNIFORM WALL THICKNESS=1.00 IN. MU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
145.09	1000.
205.08	1100.
241.88	1150.
284.86	1200.

WAVE EQUATION ANALYSIS FOR 33-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 AUGUST 1976

PROB
2 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER
QTIP=.10 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

PILE TYPE	1
NEW HAMMER DATA OPTION	1
NEW MATERIAL DATA OPTION	1
NEW PILE SECTION DATA OPTION	1
NEW SOIL DATA OPTION	1
SPECIFIED BLOW COUNT OPTION	1
OUTPUT OPTION FOR STRESS	1
BPF FOR STRESS OUTPUT OPTION	275.
ULTIMATE RESISTANCE INCREMENT (TONS)	50.0
MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)	300.
SPECIFIED SEGMENT LENGTH (FT)	-0.00

TABLE 2 -- HAMMER DATA

HAMMER DESCRIPTION	VULCAN 040 HAMMER
HAMMER EFFICIENCY	.75
HAMMER ENERGY (FT-LBS)	120000.00
HAMMER EXPLOSIVE FORCE (LBS)	-0.00
NUMBER OF HAMMER SEGMENTS	2

SEGMENT NUMBER	SLACK (IN)	WEIGHT (LB)	AREA (SQ IN)	COEF OF RESTITUTION	SPRING CONSTANT (LB / IN)
1	1000.00	40000.00	1.00	.60	2780000.00
2	1000.00	27800.00	1.00	.90	0.00

TABLE 3 -- MATERIAL DATA

NUMBER OF MATERIAL TYPES = 1

MATERIAL TYPE	(TOD)	UNIT WT. (PCF)	MODULUS (PSI)
1	33.000	490.0	29000000.

TABLE 4 -- PILE SECTION DATA

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE-STANDING PILE(FT) 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE

35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 2 33-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

QTIP=.10 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	40000.00	1.00	.60	2780000.
2	0.00	1000.00	27800.00	1.00	.90	24295040.
3	360.00	0.00	3420.85	100.53	1.00	24295040.
4	350.00	0.00	3420.85	100.53	1.00	24295040.
5	340.00	0.00	3420.85	100.53	1.00	24295040.
6	330.00	0.00	2850.71	100.53	1.00	29154048.
7	321.67	0.00	2850.71	100.53	1.00	29154048.
8	313.33	0.00	2850.71	100.53	1.00	29154048.
9	305.00	0.00	2850.71	100.53	1.00	29154048.
10	296.67	0.00	2850.71	100.53	1.00	29154048.
11	288.33	0.00	2850.71	100.53	1.00	29154048.
12	280.00	0.00	2850.71	100.53	1.00	29154048.
13	271.67	0.00	2850.71	100.53	1.00	29154048.
14	263.33	0.00	2850.71	100.53	1.00	29154048.
15	255.00	0.00	2850.71	100.53	1.00	29154048.
16	246.67	0.00	2850.71	100.53	1.00	29154048.
17	238.33	0.00	2850.71	100.53	1.00	29154048.
18	230.00	0.00	2850.71	100.53	1.00	29154048.
19	221.67	0.00	2850.71	100.53	1.00	29154048.
20	213.33	0.00	2850.71	100.53	1.00	29154048.
21	205.00	0.00	2850.71	100.53	1.00	29154048.
22	196.67	0.00	2850.71	100.53	1.00	29154048.
23	188.33	0.00	2850.71	100.53	1.00	29154048.
24	180.00	0.00	2932.16	100.53	1.00	28344213.
25	171.43	0.00	2932.16	100.53	1.00	28344213.
26	162.86	0.00	2932.16	100.53	1.00	28344213.
27	154.29	0.00	2932.16	100.53	1.00	28344213.
28	145.71	0.00	2932.16	100.53	1.00	28344213.
29	137.14	0.00	2932.16	100.53	1.00	28344213.
30	128.57	0.00	2932.16	100.53	1.00	28344213.
31	120.00	0.00	2932.16	100.53	1.00	28344213.
32	111.43	0.00	2932.16	100.53	1.00	28344213.
33	102.86	0.00	2932.16	100.53	1.00	28344213.
34	94.29	0.00	2932.16	100.53	1.00	28344213.
35	85.71	0.00	2932.16	100.53	1.00	28344213.
36	77.14	0.00	2932.16	100.53	1.00	28344213.
37	68.57	0.00	2932.16	100.53	1.00	28344213.
38	60.00	0.00	2932.16	100.53	1.00	28344213.
39	51.43	0.00	2932.16	100.53	1.00	28344213.
40	42.86	0.00	2932.16	100.53	1.00	28344213.
41	34.29	0.00	2932.16	100.53	1.00	28344213.
42	25.71	0.00	2932.16	100.53	1.00	28344213.
43	17.14	0.00	2932.16	100.53	1.00	28344213.
44	8.57	0.00	2932.16	100.53	1.00	28344213.
45	-.00	0.00	2850.71	100.53	1.00	29154048.
46	-8.33	0.00	2850.71	100.53	1.00	29154048.
47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

48	-25.00	0.00	2850.71	100.53	1.00	29154048.
9	-33.33	0.00	2850.71	100.53	1	29154048.
0	-41.67	0.00	2850.71	100.53	1	29154048.
1	-50.00	0.00	2850.71	100.53	1.	29154048.
52	-58.33	0.00	2850.71	100.53	1.00	29154048.
53	-66.67	1000.00	2850.71	100.53	1.00	29154048.

PROB 2 33-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.10 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 35

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0398 INCHES
NUMBER OF BLOWS PER FOOT = 301.72
TOTAL INTERVALS = 243

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1728012.	28	0.	69	1.000	1.703034	1.666178	-1.58
2	0.00	1262290.	39	0.	0	1.000	1.298383	1.065657	-4.56
3	360.00	12597.	41	0.	0	100.531	1.276253	1.018087	-4.44
4	350.00	12632.	43	0.	0	100.531	1.267197	.979802	-4.18
5	340.00	12693.	46	0.	0	100.531	1.259496	.941186	-3.79
6	330.00	12721.	48	0.	0	100.531	1.252440	.902787	-3.32
7	321.67	12748.	50	0.	0	100.531	1.246944	.871337	-2.93
8	313.33	12776.	52	0.	0	100.531	1.241672	.840645	-2.60
9	305.00	12804.	54	0.	0	100.531	1.236512	.810750	-2.35
10	296.67	12832.	56	0.	0	100.531	1.231362	.781593	-2.14
11	288.33	12860.	58	0.	0	100.531	1.226082	.753245	-1.91
12	280.00	12889.	60	0.	0	100.531	1.220483	.726057	-1.64
13	271.67	12917.	62	0.	0	100.531	1.214424	.700360	-1.38
14	263.33	12946.	64	0.	0	100.531	1.207704	.676099	-1.18
15	255.00	12976.	66	0.	0	100.531	1.200244	.653121	-.99
16	246.67	13006.	68	0.	0	100.531	1.191845	.631603	-.80
17	238.33	13037.	70	0.	0	100.531	1.182368	.611651	-.68
18	230.00	13066.	72	0.	0	100.531	1.171698	.592974	-.62
19	221.67	13095.	74	0.	0	100.531	1.159767	.575446	-.56
20	213.33	13123.	76	0.	0	100.531	1.146573	.559222	-.51
21	205.00	13151.	78	0.	0	100.531	1.132158	.544137	-.51
22	196.67	13178.	80	0.	0	100.531	1.116734	.529893	-.50
23	188.33	13204.	82	0.	0	100.531	1.100503	.516451	-.49
24	180.00	13233.	84	0.	0	100.531	1.083927	.503660	-.50
25	171.43	13263.	86	0.	0	100.531	1.066976	.490990	-.49
26	162.86	13291.	88	0.	0	100.531	1.050614	.478746	-.50
27	154.29	13320.	90	0.	0	100.531	1.035097	.466726	-.50
28	145.71	13348.	92	0.	0	100.531	1.020408	.454902	-.51
29	137.14	13375.	94	0.	0	100.531	1.006401	.443167	-.53
30	128.57	13402.	96	0.	0	100.531	.992635	.431397	-.54
31	120.00	13429.	98	0.	0	100.531	.978755	.419660	-.57
32	111.43	13457.	101	0.	0	100.531	.964181	.407764	-.60
33	102.86	13486.	103	0.	0	100.531	.948472	.395821	-.62
34	94.29	13516.	105	0.	0	100.531	.931167	.383731	-.66
35	85.71	13544.	107	0.	0	100.531	.911959	.371461	-.68
36	77.14	13572.	109	0.	0	100.531	.890422	.359091	-.71
37	68.57	13600.	111	0.	0	100.531	.866168	.346487	-.73

40	42.85	13469.	110	0.	0	100.531	.773253	.307881	-.74
41	34.2[illegible]	14269.	122	0.	0	100.[illegible]	.737828	.294700	-.74
42	25.7[illegible]	14983.	125	0.	0	100[illegible]	.696617	.281436	-.72
43	17.14	15590.	128	0.	0	100.	.651178	.266015	-.69
44	8.57	16904.	130	0.	0	100.531	.601424	.254526	-.65
45	-.00	17995.	133	0.	0	100.531	.547355	.240867	-.60
46	-8.33	18868.	134	0.	0	100.531	.491255	.227508	-.54
47	-16.67	19114.	136	0.	0	100.531	.432924	.213273	-.46
48	-25.00	18504.	138	0.	0	100.531	.374046	.196829	-.39
49	-33.33	17461.	139	0.	0	100.531	.316097	.177467	-.31
50	-41.67	15963.	142	0.	0	100.531	.260529	.155961	-.24
51	-50.00	14036.	143	0.	0	100.531	.211669	.133851	-.19
52	-58.33	11365.	143	0.	0	100.531	.171355	.112990	-.14
53	-66.67	7997.	145	0.	0	100.531	.139772	.095406	-.10

PROB 2 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.10 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.25	50.	52.66	13089.	43	9539.	10
4.19	100.	97.95	13891.	43	7714.	9
6.21	150.	137.25	14105.	44	5722.	8
9.24	200.	171.62	14286.	44	4091.	7
13.39	250.	201.85	14549.	45	2563.	6
15.94	300.	228.56	14804.	45	481.	7
18.60	350.	252.39	15232.	47	0.	53
21.90	400.	273.55	15785.	47	0.	53
25.76	450.	292.50	16299.	47	0.	53
30.43 ✓	500.	309.42	16741.	47	0.	53
36.15	550.	324.52	17131.	47	0.	53
43.29 ✓	600.	338.09	17462.	47	0.	53
52.42 ✓	650.	350.30	17794.	47	0.	53
64.33 ✓	700.	361.33	18070.	47	0.	53
80.54 ✓	750.	371.00	18321.	47	0.	53
103.50 ✓	800.	379.08	18553.	47	0.	53
138.20 ✓	850.	386.12	18763.	47	0.	53
194.99 ✓	900.	392.43	18951.	47	0.	53
301.72	✓ 950.	396.97	19114.	47	0.	53

PROB 2 33-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.10 ,UNIFORM WALL THICKNESS=1.00 IN. KU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
138.20	850.
194.99	900.
240.55	926.
301.72	950.

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WAVE EQUATION ANALYSIS FOR 33-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 AUGUST 1976

 PROB
   3      33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
          75 FT PENETRATION -- VULCAN 040 HAMMER
          QTIP=.30 ,UNIFORM WALL THICKNESS=1.00 IN.    RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

      PILE TYPE                               1
      NEW HAMMER DATA OPTION                  1
      NEW MATERIAL DATA OPTION                1
      NEW PILE SECTION DATA OPTION            1
      NEW SOIL DATA OPTION                    1
      SPECIFIED BLOW COUNT OPTION             1
      OUTPUT OPTION FOR STRESS                1
      BPF FOR STRESS OUTPUT OPTION                            275.
      ULTIMATE RESISTANCE INCREMENT (TONS)                    50.0
      MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)               300.
      SPECIFIED SEGMENT LENGTH (FT)                          -0.00

TABLE 2 -- HAMMER DATA

      HAMMER DESCRIPTION            VULCAN 040 HAMMER
      HAMMER EFFICIENCY                   .75
      HAMMER ENERGY (FT-LBS)        120000.00
      HAMMER EXPLOSIVE FORCE (LBS)      -0.00
      NUMBER OF HAMMER SEGMENTS             2

      SEGMENT     SLACK       WEIGHT      AREA     COEF OF     SPRING CONSTANT
       NUMBER     (IN)         (LB)     (SQ IN) RESTITUTION      (LB / IN)

         1       1000.00  40000.00      1.00       .60        2780000.00
         2       1000.00  27800.00      1.00       .90              0.00

TABLE 3 -- MATERIAL DATA

      NUMBER OF MATERIAL TYPES =     1

         MATERIAL       (TOD)   UNIT WT.    MODULUS
           TYPE                  (PCF)       (PSI)

             1          33.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

      TOTAL NUMBER OF PILE SECTIONS         8
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NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE STANDING PILE(FT) 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE - JSIDE .15
POINT DAMPENING RESISTANCE - JPOINT .15
SOIL QUAKE FOR SIDE - QSIDE .10
SOIL QUAKE FOR POINT - QPOINT .30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 3 33-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30 ,UNIFORM WALL THICKNESS=1.00 IN. NU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	40000.00	1.00	.60	2780000.
2	0.00	1000.00	27800.00	1.00	.90	24295040.
3	360.00	0.00	3420.85	100.53	1.00	24295040.
4	350.00	0.00	3420.85	100.53	1.00	24295040.
5	340.00	0.00	3420.85	100.53	1.00	24295040.
6	330.00	0.00	2850.71	100.53	1.00	29154048.
7	321.67	0.00	2850.71	100.53	1.00	29154048.
8	313.33	0.00	2850.71	100.53	1.00	29154048.
9	305.00	0.00	2850.71	100.53	1.00	29154048.
10	296.67	0.00	2850.71	100.53	1.00	29154048.
11	288.33	0.00	2850.71	100.53	1.00	29154048.
12	280.00	0.00	2850.71	100.53	1.00	29154048.
13	271.67	0.00	2850.71	100.53	1.00	29154048.
14	263.33	0.00	2850.71	100.53	1.00	29154048.
15	255.00	0.00	2850.71	100.53	1.00	29154048.
16	246.67	0.00	2850.71	100.53	1.00	29154048.
17	238.33	0.00	2850.71	100.53	1.00	29154048.
18	230.00	0.00	2850.71	100.53	1.00	29154048.
19	221.67	0.00	2850.71	100.53	1.00	29154048.
20	213.33	0.00	2850.71	100.53	1.00	29154048.
21	205.00	0.00	2850.71	100.53	1.00	29154048.
22	196.67	0.00	2850.71	100.53	1.00	29154048.
23	188.33	0.00	2850.71	100.53	1.00	29154048.
24	180.00	0.00	2932.16	100.53	1.00	28344213.
25	171.43	0.00	2932.16	100.53	1.00	28344213.
26	162.86	0.00	2932.16	100.53	1.00	28344213.
27	154.29	0.00	2932.16	100.53	1.00	28344213.
28	145.71	0.00	2932.16	100.53	1.00	28344213.
29	137.14	0.00	2932.16	100.53	1.00	28344213.
30	128.57	0.00	2932.16	100.53	1.00	28344213.
31	120.00	0.00	2932.16	100.53	1.00	28344213.
32	111.43	0.00	2932.16	100.53	1.00	28344213.
33	102.86	0.00	2932.16	100.53	1.00	28344213.
34	94.29	0.00	2932.16	100.53	1.00	28344213.
35	85.71	0.00	2932.16	100.53	1.00	28344213.
36	77.14	0.00	2932.16	100.53	1.00	28344213.
37	68.57	0.00	2932.16	100.53	1.00	28344213.
38	60.00	0.00	2932.16	100.53	1.00	28344213.
39	51.43	0.00	2932.16	100.53	1.00	28344213.
40	42.86	0.00	2932.16	100.53	1.00	28344213.
41	34.29	0.00	2932.16	100.53	1.00	28344213.
42	25.71	0.00	2932.16	100.53	1.00	28344213.
43	17.14	0.00	2932.16	100.53	1.00	28344213.
44	8.57	0.00	2932.16	100.53	1.00	28344213.
45	-.00	0.00	2850.71	100.53	1.00	29154048.
46	-8.33	0.00	2850.71	100.53	1.00	29154048.

48	-25.00	0.00	2850.71	100.53	1.00	29154048.
49	-33.33	0.00	2850.71	100.53	[illegible]	29154048.
[illegible]	-41.67	0.00	2850.71	100.53	[illegible]	29154048.
1	-50.00	0.00	2850.71	100.53	1..	29154048.
52	-58.33	0.00	2850.71	100.53	1.00	29154048.
53	-66.67	1000.00	2850.71	100.53	1.00	29154048.

PROB 3 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0346 INCHES
NUMBER OF BLOWS PER FOOT = 347.18
TOTAL INTERVALS = 238

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1728012.	28	0.	69	1.000	1.723648	1.715646	-.54
2	0.00	1262290.	39	0.	0	1.000	1.319894	1.227032	-2.51
3	360.00	12597.	41	0.	0	100.531	1.298219	1.191178	-2.38
4	350.00	12632.	43	0.	0	100.531	1.288642	1.163565	-2.30
5	340.00	12693.	46	0.	0	100.531	1.280531	1.134191	-2.37
6	330.00	12721.	48	0.	0	100.531	1.273121	1.103236	-2.50
7	321.67	12748.	50	0.	0	100.531	1.267376	1.076668	-2.58
8	313.33	12776.	52	0.	0	100.531	1.261886	1.049648	-2.60
9	305.00	12804.	54	0.	0	100.531	1.256598	1.022385	-2.59
10	296.67	12832.	56	0.	0	100.531	1.251405	.994953	-2.55
11	288.33	12860.	58	0.	0	100.531	1.246161	.967495	-2.48
12	280.00	12889.	60	0.	0	100.531	1.240694	.940358	-2.36
13	271.67	12917.	62	0.	0	100.531	1.234899	.913917	-2.23
14	263.33	12946.	64	0.	0	100.531	1.228557	.888299	-2.14
15	255.00	12975.	66	0.	0	100.531	1.221545	.863400	-2.08
16	246.67	13008.	68	0.	0	100.531	1.213746	.839184	-2.03
17	238.33	13037.	70	0.	0	100.531	1.205023	.815848	-1.93
18	230.00	13066.	72	0.	0	100.531	1.195263	.793648	-1.82
19	221.67	13095.	74	0.	0	100.531	1.184360	.772691	-1.69
20	213.33	13123.	76	0.	0	100.531	1.172267	.752944	-1.58
21	205.00	13151.	78	0.	0	100.531	1.158990	.734319	-1.46
22	196.67	13178.	80	0.	0	100.531	1.144589	.716717	-1.35
23	188.33	13204.	82	0.	0	100.531	1.129202	.700068	-1.24
24	180.00	13233.	84	0.	0	100.531	1.112972	.684294	-1.14
25	171.43	13263.	86	0.	0	100.531	1.095825	.668858	-1.05
26	162.86	13291.	88	0.	0	100.531	1.078689	.654117	-.96
27	154.29	13320.	90	0.	0	100.531	1.062102	.640036	-.88
28	145.71	13348.	92	0.	0	100.531	1.046388	.626460	-.83
29	137.14	13375.	94	0.	0	100.531	1.031581	.613262	-.78
30	128.57	13402.	96	0.	0	100.531	1.017474	.600476	-.74
31	120.00	13429.	98	0.	0	100.531	1.003695	.587945	-.72
32	111.43	13457.	101	0.	0	100.531	.989610	.575588	-.69
33	102.86	13486.	103	0.	0	100.531	.974922	.563421	-.69
34	94.29	13516.	105	0.	0	100.531	.959134	.551244	-.69
35	85.71	13544.	107	0.	0	100.531	.941957	.539115	-.68
36	77.14	13572.	109	0.	0	100.531	.923188	.526950	-.69
37	68.57	13599.	111	0.	0	100.531	.902547	.514622	-.69
38	60.00	13632.	113	0.	0	100.531	.879815	.502205	-.69

40	42.86	13742.	118	0.	0	100.531	.827183	.479102	-.64
41	34.29	14031.	120	0.	0	100.531	.797358	.463573	-.68
42	25.71	14461.	123	0.	0	100.531	.763908	.450172	-.66
43	17.14	15026.	126	0.	0	100.	.727299	.436473	-.64
44	8.57	15630.	128	0.	0	100.531	.688213	.422446	-.60
45	-.00	16195.	130	0.	0	100.531	.648004	.408106	-.56
46	-8.33	16681.	133	0.	0	100.531	.607931	.393824	-.50
47	-16.67	16967.	135	0.	0	100.531	.566268	.378774	-.44
48	-25.00	16705.	136	0.	0	100.531	.523739	.362258	-.37
49	-33.33	15753.	136	0.	0	100.531	.481232	.344050	-.31
50	-41.67	14358.	142	0.	0	100.531	.439393	.324341	-.25
51	-50.00	13046.	144	0.	0	100.531	.399916	.303615	-.19
52	-58.33	11617.	146	0.	0	100.531	.365037	.282649	-.15
53	-66.67	9917.	148	0.	0	100.531	.334568	.262195	-.11

PROB 3 33-IN. DIAMETER PILES MLH=105FT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

QTIP=.30 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 50

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.00	50.	75.16	13075.	43	9514.	10
4.06	100.	139.70	13656.	43	7632.	9
6.57	150.	195.60	13997.	44	5531.	9
10.29	200.	244.29	14144.	44	3805.	8
15.59	250.	287.08	14278.	44	2514.	7
19.50 ✓	300.	324.67	14457.	45	1161.	6
23.75	350.	357.72	14651.	45	0.	53
29.12 ✓	400.	387.10	14837.	45	0.	53
36.11	450.	413.43	15036.	45	0.	53
45.56 ✓	500.	436.52	15287.	46	0.	53
58.90 ✓	550.	456.17	15631.	47	0.	53
78.99 ✓	600.	475.73	15999.	47	0.	53
112.21 ✓	650.	490.30	16349.	47	0.	53
176.36 ✓	700.	502.02	16675.	47	0.	53
347.18 ✓	750.	498.48	16967.	47	0.	53

PROB 3 33-IN. DIAMETER PILES MLW=10SFT 3-PILE STRUCTURES
75 FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30 ,UNIFORM WALL THICKNESS=1.00 IN. RU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
143.96	679.
176.36	700.
226.74	722.
277.96	736.

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WAVE EQUATION ANALYSIS FOR 33-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACHR 3-PILE STRUCTURES -- U.S.NAVY
25 AUGUST 1976

PROB
  4      33-IN. DIAMETER PILES MLW#105FT 3-PILE STRUCTURES
         150FT PENETRATION -- VULCAN 040 HAMMER
         WTIP=.025, UNIFORM WALL THICKNESS=1.0 IN.    RU = 14

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                                  1
     NEW HAMMER DATA OPTION                     1
     NEW MATERIAL DATA OPTION                   1
     NEW PILE SECTION DATA OPTION               1
     NEW SOIL DATA OPTION                       1
     SPECIFIED BLOW COUNT OPTION                1
     OUTPUT OPTION FOR STRESS                   1
     BPF FOR STRESS OUTPUT OPTION                           275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                   50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)              300.
     SPECIFIED SEGMENT LENGTH (FT)                          -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION              VULCAN 040 HAMMER
     HAMMER EFFICIENCY                         .75
     HAMMER ENERGY (FT-LBS)              120000.00
     HAMMER EXPLOSIVE FORCE (LBS)            -0.00
     NUMBER OF HAMMER SEGMENTS                   2

     SEGMENT      SLACK      WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER      (IN)        (LB)     (SQ IN) RESTITUTION     (LB / IN)

        1       1002.00   40000.00      1.00        .60        2780000.00
        2       1000.00   27800.00      1.00        .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL       (TOD)    UNIT WT.    MODULUS
           TYPE                   (PCF)       (PSI)

             1         33.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS         9
     NUMBER OF SECTIONS CHANGED            0
```

NUMBER OF SECTIONS ADDED 9
LENGTH OF FREE STANDING PILE(FT) --- 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435
9	1	1.000	75.	435	510

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

NUMBER OF SECTIONS ADDED 0
LENGTH OF FREE-STANDING PILE(FT) 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435
9	1	1.000	75.	435	510

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .03

TIP RESISTANCE PERCENTAGE
14.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 4 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

QTIPS=.025, UNIFORM WALL THICKNESS=1.0 IN. MU = 14

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	40000.00	1.00	.60	2780000.
2	0.00	1000.00	27800.00	1.00	.90	24295040.
3	360.00	0.00	3420.85	100.53	1.00	24295040.
4	350.00	0.00	3420.85	100.53	1.00	24295040.
5	340.00	0.00	3420.85	100.53	1.00	24295040.
6	330.00	0.00	2850.71	100.53	1.00	29154048.
7	321.67	0.00	2850.71	100.53	1.00	29154048.
8	313.33	0.00	2850.71	100.53	1.00	29154048.
9	305.00	0.00	2850.71	100.53	1.00	29154048.
10	296.67	0.00	2850.71	100.53	1.00	29154048.
11	288.33	0.00	2850.71	100.53	1.00	29154048.
12	280.00	0.00	2850.71	100.53	1.00	29154048.
13	271.67	0.00	2850.71	100.53	1.00	29154048.
14	263.33	0.00	2850.71	100.53	1.00	29154048.
15	255.00	0.00	2850.71	100.53	1.00	29154048.
16	246.67	0.00	2850.71	100.53	1.00	29154048.
17	238.33	0.00	2850.71	100.53	1.00	29154048.
18	230.00	0.00	2850.71	100.53	1.00	29154048.
19	221.67	0.00	2850.71	100.53	1.00	29154048.
20	213.33	0.00	2850.71	100.53	1.00	29154048.
21	205.00	0.00	2850.71	100.53	1.00	29154048.
22	196.67	0.00	2850.71	100.53	1.00	29154048.
23	188.33	0.00	2850.71	100.53	1.00	29154048.
24	180.00	0.00	2932.16	100.53	1.00	28344213.
25	171.43	0.00	2932.16	100.53	1.00	28344213.
26	162.86	0.00	2932.16	100.53	1.00	28344213.
27	154.29	0.00	2932.16	100.53	1.00	28344213.
28	145.71	0.00	2932.16	100.53	1.00	28344213.
29	137.14	0.00	2932.16	100.53	1.00	28344213.
30	128.57	0.00	2932.16	100.53	1.00	28344213.
31	120.00	0.00	2932.16	100.53	1.00	28344213.
32	111.43	0.00	2932.16	100.53	1.00	28344213.
33	102.86	0.00	2932.16	100.53	1.00	28344213.
34	94.29	0.00	2932.16	100.53	1.00	28344213.
35	85.71	0.00	2932.16	100.53	1.00	28344213.
36	77.14	0.00	2932.16	100.53	1.00	28344213.
37	68.57	0.00	2932.16	100.53	1.00	28344213.
38	60.00	0.00	2932.16	100.53	1.00	28344213.
39	51.43	0.00	2932.16	100.53	1.00	28344213.
40	42.86	0.00	2932.16	100.53	1.00	28344213.
41	34.29	0.00	2932.16	100.53	1.00	28344213.
42	25.71	0.00	2932.16	100.53	1.00	28344213.
43	17.14	0.00	2932.16	100.53	1.00	28344213.
44	8.57	0.00	2932.16	100.53	1.00	28344213.
45	-.00	0.00	2850.71	100.53	1.00	29154048.
46	-8.33	0.00	2850.71	100.53	1.00	29154048.

48	-25.00	0.00	2850.71	100.53	1.00	29154048.
49	-33.33	0.00	2850.71	100.53	1.00	29154048.
50	-41.67	0.00	2850.71	100.53	1.00	29154048.
51	-50.00	0.00	2850.71	100.53	1.00	29154048.
52	-58.33	0.00	2850.71	100.53	1.00	29154048.
53	-66.67	0.00	2850.71	100.53	1.00	29154048.
54	-75.00	0.00	2850.71	100.53	1.00	29154048.
55	-83.33	0.00	2850.71	100.53	1.00	29154048.
56	-91.67	0.00	2850.71	100.53	1.00	29154048.
57	-100.00	0.00	2850.71	100.53	1.00	29154048.
58	-108.33	0.00	2850.71	100.53	1.00	29154048.
59	-116.67	0.00	2850.71	100.53	1.00	29154048.
60	-125.00	0.00	2850.71	100.53	1.00	29154048.
61	-133.33	0.00	2850.71	100.53	1.00	29154048.
62	-141.67	1000.00	2850.71	100.53	1.00	29154048.

PROB 4 53-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

QTIP=.025, UNIFORM WALL THICKNESS=1.0 IN. RU = 14

TABLE 6 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 14.00

PERMANENT SET OF PILE = .0349 INCHES
NUMBER OF BLOWS PER FOOT = 343.57
TOTAL INTERVALS = 412

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1720012.	28	0.	412	1.000	1.738313	-3.100949	-12.04
2	0.00	1262290.	39	0.	412	1.000	1.335441	-.089001	-1.85
3	360.00	12597.	41	467.	299	100.531	1.314604	.159178	-1.21
4	350.00	12632.	43	700.	301	100.531	1.304808	.158647	-1.21
5	340.00	12693.	46	509.	303	100.531	1.296145	.157625	-1.22
6	330.00	12721.	48	417.	305	100.531	1.288248	.156070	-1.21
7	321.67	12748.	50	486.	363	100.531	1.282107	.154509	-1.22
8	313.33	12776.	52	552.	360	100.531	1.276266	.152562	-1.22
9	305.00	12804.	54	610.	360	100.531	1.270728	.150357	-1.22
10	296.67	12832.	56	607.	362	100.531	1.265365	.147891	-1.22
11	288.33	12860.	58	705.	359	100.531	1.260073	.145131	-1.22
12	280.00	12889.	60	737.	359	100.531	1.254728	.142221	-1.23
13	271.67	12917.	62	755.	361	100.531	1.249161	.139093	-1.23
14	263.33	12945.	64	770.	357	100.531	1.243198	.135810	-1.22
15	255.00	12976.	66	772.	358	100.531	1.236712	.132459	-1.23
16	246.67	13009.	68	752.	360	100.531	1.229567	.129009	-1.23
17	238.33	13037.	70	715.	356	100.531	1.221707	.125570	-1.23
18	230.00	13066.	72	695.	357	100.531	1.212942	.122170	-1.24
19	221.67	13095.	74	646.	359	100.531	1.203178	.118843	-1.23
20	213.33	13123.	76	709.	354	100.531	1.192308	.115648	-1.24
21	205.00	13151.	78	780.	356	100.531	1.180327	.112624	-1.24
22	196.67	13178.	80	832.	338	100.531	1.167211	.109845	-1.25
23	188.33	13204.	82	844.	340	100.531	1.152958	.107286	-1.25
24	180.00	13233.	84	847.	342	100.531	1.137684	.104981	-1.24
25	171.43	13263.	86	810.	344	100.531	1.121032	.102945	-1.26
26	162.86	13291.	88	759.	346	100.531	1.103834	.101248	-1.26
27	154.29	13320.	90	662.	348	100.531	1.086521	.099853	-1.25
28	145.71	13349.	92	585.	350	100.531	1.069647	.098755	-1.26
29	137.14	13375.	94	462.	352	100.531	1.053602	.098073	-1.27
30	128.57	13402.	96	307.	354	100.531	1.038503	.097632	-1.25
31	120.00	13429.	98	258.	356	100.531	1.024168	.097482	-1.25
32	111.43	13457.	101	102.	412	100.531	1.010223	.097702	-1.25
33	102.86	13486.	103	231.	412	100.531	.996140	.098277	-1.23
34	94.29	13516.	105	344.	412	100.531	.981487	.099097	-1.20
35	85.71	13544.	107	469.	412	100.531	.965856	.100316	-1.19
36	77.14	13572.	109	536.	412	100.531	.948646	.101977	-1.17
37	68.57	13598.	111	617.	412	100.531	.930373	.103676	-1.11
38	60.00	13628.	113	755.	412	100.531	.909960	.106065	-1.08
39	51.43	13670.	115	868.	412	100.531	.887422	.108736	-1.04

40	42.85	13735.	117	890.	412	100.531	.662648	.111743	-1.01
41	34.[illegible]	13801.	120	976.	412	100.[illegible]	.835510	.114919	-.95
42	25.[illegible]	14126.	122	1074.	412	100.[illegible]	.805823	.118382	-.93
43	17.1	14492.	125	1131.	412	100.[illegible]	.773343	.122190	-.88
44	8.57	14958.	127	1184.	412	100.531	.737997	.126199	-.81
45	-.00	15511.	130	1264.	412	100.531	.699983	.130400	-.75
46	-8.33	16004.	132	1257.	412	100.531	.660371	.134759	-.70
47	-16.67	16317.	134	1050.	412	100.531	.618430	.139095	-.63
48	-25.00	16459.	137	710.	412	100.531	.574535	.142714	-.53
49	-33.33	16422.	139	270.	412	100.531	.529223	.145163	-.44
50	-41.67	16208.	141	0.	0	100.531	.483009	.146095	-.38
51	-50.00	15825.	144	0.	0	100.531	.436227	.144998	-.31
52	-58.33	15259.	146	0.	0	100.531	.389239	.141235	-.20
53	-66.67	14610.	147	0.	0	100.531	.342515	.134175	-.07
54	-75.00	13928.	150	0.	0	100.531	.296456	.123573	.01
55	-83.33	13106.	152	0.	0	100.531	.252421	.110419	.02
56	-91.67	12051.	153	0.	0	100.531	.211359	.096078	-.04
57	-100.00	10653.	155	0.	0	100.531	.173913	.081656	-.10
58	-108.33	9123.	158	0.	0	100.531	.141070	.068093	-.15
59	-116.67	7383.	157	0.	0	100.531	.113434	.056241	-.18
60	-125.00	5825.	156	0.	0	100.531	.091062	.046906	-.17
61	-133.33	4497.	159	0.	0	100.531	.073472	.040629	-.15
62	-141.67	3477.	159	0.	0	100.531	.059927	.037263	-.11

PNUB 4 53-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES

150FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.025, UNIFORM WALL THICKNESS=1.0 IN. NU = 14

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.11	50.	21.37	13024.	50	9927.	10
3.67	100.	39.98	13699.	48	8535.	9
5.57	150.	56.24	14174.	49	6776.	9
9.92	200.	70.46	14332.	49	5243.	8
12.14	250.	82.91	14477.	49	3902.	7
14.31	300.	93.80	14614.	49	2060.	6
16.51	350.	103.35	14752.	49	0.	62
19.09	400.	111.72	14887.	49	0.	62
22.13	450.	119.07	15018.	49	0.	62
25.76	500.	125.55	15141.	49	0.	62
30.15	550.	131.24	15265.	49	0.	62
35.54	600.	136.14	15386.	49	0.	62
42.21	650.	140.16	15504.	49	0.	62
50.87	700.	143.51	15620.	49	0.	62
62.04	750.	146.33	15732.	49	805.	13
76.37	800.	148.47	15838.	49	782.	12
97.05	850.	149.84	15940.	49	775.	23
124.75	900.	154.11	16047.	48	877.	23
161.31	950.	159.43	16150.	48	882.	23
205.97	1000.	165.05	16253.	48	875.	23
265.63	1050.	170.35	16356.	48	1190.	45
345.57	1100.	174.79	16459.	48	1264.	45

PNUB 4 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

150FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.025, UNIFORM WALL THICKNESS=1.0 IN. KU = 14

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 14.00

BLOWS PER FOOT	RESISTANCE TONS
161.31	950.
205.97	1000.
263.65	1050.
295.93	1073.

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WAVE EQUATION ANALYSIS FOR 33-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 AUGUST 1976

 PROB
   5      33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
          150FT PENETRATION -- VULCAN 040 HAMMER
          WTIP=0.10, UNIFORM WALL THICKNESS=1.0 IN.    RU = 35

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                              1
     NEW HAMMER DATA OPTION                 1
     NEW MATERIAL DATA OPTION               1
     NEW PILE SECTION DATA OPTION           1
     NEW SOIL DATA OPTION                   1
     SPECIFIED BLOW COUNT OPTION            1
     OUTPUT OPTION FOR STRESS               1
     BPF FOR STRESS OUTPUT OPTION                     275.
     ULTIMATE RESISTANCE INCREMENT (TONS)             50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)        300.
     SPECIFIED SEGMENT LENGTH (FT)                    -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION            VULCAN 040 HAMMER
     HAMMER EFFICIENCY                    .75
     HAMMER ENERGY (FT-LBS)         120000.00
     HAMMER EXPLOSIVE FORCE (LBS)       -0.00
     NUMBER OF HAMMER SEGMENTS              2

     SEGMENT     SLACK      WEIGHT     AREA    COEF OF     SPRING CONSTANT
      NUMBER     (IN)        (LB)    (SQ IN) RESTITUTION     (LB / IN)

        1       1000.00  40000.00     1.00       .60        2780000.00
        2       1000.00  27800.00     1.00       .90              0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =    1

         MATERIAL       (TOD)   UNIT WT.    MODULUS
           TYPE                  (PCF)       (PSI)

            1          33.000      490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS          9
     NUMBER OF SECTIONS CHANGED             0
     NUMBER OF SECTIONS ADDED               0
```

NUMBER OF SECTIONS [illegible] 9
LENGTH OF FREE-STANDING-PILE(FT) 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435
9	1	1.000	75.	435	510

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .10

TIP RESISTANCE PERCENTAGE

35.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PROB 5 35-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

QTIP=0.10, UNIFORM WALL THICKNESS=1.0 IN. KU = 35

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	40000.00	1.00	.60	2780000.
2	0.00	1000.00	27800.00	1.00	.90	24295040.
3	360.00	0.00	3420.85	100.53	1.00	24295040.
4	350.00	0.00	3420.85	100.53	1.00	24295040.
5	340.00	0.00	3420.85	100.53	1.00	24295040.
6	330.00	0.00	2850.71	100.53	1.00	29154048.
7	321.67	0.00	2850.71	100.53	1.00	29154048.
8	313.33	0.00	2850.71	100.53	1.00	29154048.
9	305.00	0.00	2850.71	100.53	1.00	29154048.
10	296.67	0.00	2850.71	100.53	1.00	29154048.
11	288.33	0.00	2850.71	100.53	1.00	29154048.
12	280.00	0.00	2850.71	100.53	1.00	29154048.
13	271.67	0.00	2850.71	100.53	1.00	29154048.
14	263.33	0.00	2850.71	100.53	1.00	29154048.
15	255.00	0.00	2850.71	100.53	1.00	29154048.
16	246.67	0.00	2850.71	100.53	1.00	29154048.
17	238.33	0.00	2850.71	100.53	1.00	29154048.
18	230.00	0.00	2850.71	100.53	1.00	29154048.
19	221.67	0.00	2850.71	100.53	1.00	29154048.
20	213.33	0.00	2850.71	100.53	1.00	29154048.
21	205.00	0.00	2850.71	100.53	1.00	29154048.
22	196.67	0.00	2850.71	100.53	1.00	29154048.
23	188.33	0.00	2850.71	100.53	1.00	29154048.
24	180.00	0.00	2932.16	100.53	1.00	28344213.
25	171.43	0.00	2932.16	100.53	1.00	28344213.
26	162.86	0.00	2932.16	100.53	1.00	28344213.
27	154.29	0.00	2932.16	100.53	1.00	28344213.
28	145.71	0.00	2932.16	100.53	1.00	28344213.
29	137.14	0.00	2932.16	100.53	1.00	28344213.
30	128.57	0.00	2932.16	100.53	1.00	28344213.
31	120.00	0.00	2932.16	100.53	1.00	28344213.
32	111.43	0.00	2932.16	100.53	1.00	28344213.
33	102.86	0.00	2932.16	100.53	1.00	28344213.
34	94.29	0.00	2932.16	100.53	1.00	28344213.
35	85.71	0.00	2932.16	100.53	1.00	28344213.
36	77.14	0.00	2932.16	100.53	1.00	28344213.
37	68.57	0.00	2932.16	100.53	1.00	28344213.
38	60.00	0.00	2932.16	100.53	1.00	28344213.
39	51.43	0.00	2932.16	100.53	1.00	28344213.
40	42.86	0.00	2932.16	100.53	1.00	28344213.
41	34.29	0.00	2932.16	100.53	1.00	28344213.
42	25.71	0.00	2932.16	100.53	1.00	28344213.
43	17.14	0.00	2932.16	100.53	1.00	28344213.
44	8.57	0.00	2932.16	100.53	1.00	28344213.
45	-.00	0.00	2850.71	100.53	1.00	29154048.
46	-8.33	0.00	2850.71	100.53	1.00	29154048.
47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

48	-25.00	0.00	2850.71	100.53	1.00	29154048.
49	-33.33	0.00	2850.71	100.53	1.00	29154048.
50	-41.67	0.00	2850.71	100.53	1.00	29154048.
51	-50.00	0.00	2850.71	100.53	1.	29154048.
52	-58.33	0.00	2850.71	100.53	1.00	29154048.
53	-66.67	0.00	2850.71	100.53	1.00	29154048.
54	-75.00	0.00	2850.71	100.53	1.00	29154048.
55	-83.33	0.00	2850.71	100.53	1.00	29154048.
56	-91.67	0.00	2850.71	100.53	1.00	29154048.
57	-100.00	0.00	2850.71	100.53	1.00	29154048.
58	-108.33	0.00	2850.71	100.53	1.00	29154048.
59	-116.67	0.00	2850.71	100.53	1.00	29154048.
60	-125.00	0.00	2850.71	100.53	1.00	29154048.
61	-133.33	0.00	2850.71	100.53	1.00	29154048.
62	-141.67	1000.00	2850.71	100.53	1.00	29154048.

PNOB 5 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

QTIP=0.10, UNIFORM WALL THICKNESS=1.0 IN. RU = 35

TABLE 6 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 35.00

PERMANENT SET OF PILE = .0402 INCHES
NUMBER OF BLOWS PER FOOT = 298.60
TOTAL INTERVALS = 258

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1726012.	28	0.	69	1.000	1.757080	1.724664	-1.20
2	0.00	1262290.	39	0.	0	1.000	1.354421	1.199605	-2.65
3	360.00	12597.	41	0.	0	100.531	1.334637	1.163587	-2.76
4	350.00	12632.	43	0.	0	100.531	1.325022	1.136061	-2.87
5	340.00	12693.	46	0.	0	100.531	1.315995	1.107290	-2.95
6	330.00	12721.	48	0.	0	100.531	1.307589	1.077455	-2.98
7	321.67	12748.	50	0.	0	100.531	1.301024	1.052134	-2.96
8	313.33	12776.	52	0.	0	100.531	1.294790	1.026649	-2.89
9	305.00	12804.	54	0.	0	100.531	1.288866	1.001273	-2.79
10	296.67	12832.	56	0.	0	100.531	1.283240	.976173	-2.68
11	288.33	12860.	58	0.	0	100.531	1.277813	.951408	-2.57
12	280.00	12889.	60	0.	0	100.531	1.272445	.926995	-2.46
13	271.67	12917.	62	0.	0	100.531	1.266990	.902974	-2.34
14	263.33	12946.	64	0.	0	100.531	1.261277	.879468	-2.18
15	255.00	12976.	66	0.	0	100.531	1.255194	.856714	-1.99
16	246.67	13008.	68	0.	0	100.531	1.248594	.834993	-1.77
17	238.33	13037.	70	0.	0	100.531	1.241368	.814490	-1.55
18	230.00	13066.	72	0.	0	100.531	1.233435	.795162	-1.37
19	221.67	13095.	74	0.	0	100.531	1.224649	.776761	-1.24
20	213.33	13123.	76	0.	0	100.531	1.214943	.758991	-1.15
21	205.00	13151.	78	0.	0	100.531	1.204254	.741733	-1.06
22	196.67	13178.	80	0.	0	100.531	1.192485	.725112	-.93
23	188.33	13204.	82	0.	0	100.531	1.179681	.709317	-.80
24	180.00	13233.	84	0.	0	100.531	1.165765	.694382	-.68
25	171.43	13263.	86	0.	0	100.531	1.150382	.679818	-.58
26	162.86	13291.	88	0.	0	100.531	1.134066	.666014	-.47
27	154.29	13320.	90	0.	0	100.531	1.116993	.653009	-.38
28	145.71	13348.	92	0.	0	100.531	1.099523	.640602	-.34
29	137.14	13375.	94	0.	0	100.531	1.082165	.628449	-.33
30	128.57	13402.	96	0.	0	100.531	1.065492	.616500	-.32
31	120.00	13429.	98	0.	0	100.531	1.049812	.604755	-.33
32	111.43	13457.	101	0.	0	100.531	1.035099	.592971	-.36
33	102.86	13486.	103	0.	0	100.531	1.020889	.581091	-.38
34	94.29	13516.	105	0.	0	100.531	1.006785	.569177	-.42
35	85.71	13544.	107	0.	0	100.531	.992235	.557080	-.46
36	77.14	13572.	109	0.	0	100.531	.976899	.544804	-.50
37	68.57	13598.	111	0.	0	100.531	.960428	.532398	-.54
38	60.00	13620.	113	0.	0	100.531	.942615	.519792	-.57

40	42.86	13717.	117	0.	0	100.531	.902214	.494227	-.63
41	34.29	13810.	120	0.	0	100.531	.879165	.481261	-.65
42	25.7[illegible]	13976.	122	0.	0	100[illegible]	.854210	.468224	-.67
43	17.1[illegible]	14208.	124	0.	0	100.[illegible]	.827211	.455114	-.68
44	8.57	14513.	127	0.	0	100.531	.797911	.441982	-.68
45	-.00	14875.	129	0.	0	100.531	.766460	.428801	-.68
46	-8.33	15212.	131	0.	0	100.531	.733649	.415963	-.67
47	-16.67	15445.	134	0.	0	100.531	.698875	.402956	-.65
48	-25.00	15581.	136	0.	0	100.531	.662636	.389477	-.63
49	-33.33	15617.	138	0.	0	100.531	.625170	.375210	-.60
50	-41.67	15545.	140	0.	0	100.531	.586744	.359886	-.56
51	-50.00	15370.	142	0.	0	100.531	.547336	.343158	-.51
52	-58.33	15077.	144	0.	0	100.531	.506878	.324728	-.46
53	-66.67	14658.	146	0.	0	100.531	.465436	.304618	-.41
54	-75.00	14170.	149	0.	0	100.531	.423306	.283065	-.37
55	-83.33	13855.	153	0.	0	100.531	.381342	.260339	-.32
56	-91.67	13449.	153	0.	0	100.531	.340528	.236875	-.29
57	-100.00	12914.	155	0.	0	100.531	.300904	.213097	-.25
58	-108.33	12038.	157	0.	0	100.531	.262414	.189521	-.22
59	-116.67	11135.	160	0.	0	100.531	.225484	.166653	-.19
60	-125.00	10543.	162	0.	0	100.531	.193210	.145106	-.16
61	-133.33	9115.	161	0.	0	100.531	.164990	.125435	-.13
62	-141.67	7464.	163	0.	0	100.531	.140187	.108161	-.10

AD-A163 522 FOUNDATION ANALYSIS EAST COAST AIR COMBAT MANEUVERING 6/6
RANGE OFFSHORE KITT..(U) CREST ENGINEERING INC TULSA OK
SEP 76 27-771-97 CHES/NAVFAC-FPO-7612 N62477-76-C-0179

UNCLASSIFIED F/G 13/13 NL

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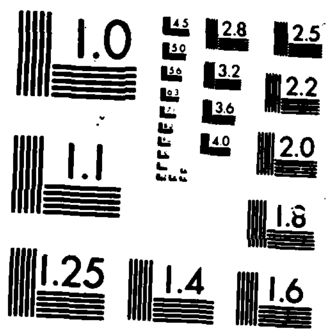

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

PROB 5 33-IN. DIAMETER PILES ML=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

QTIP=0.10, UNIFORM WALL THICKNESS=1.0 IN. RU = 35

TABLE 9 -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
2.06	50.	53.26	13026.	50	9833.	10
3.73	100.	99.42	13957.	49	8399.	9
5.58	150.	139.58	14116.	49	6504.	8
10.29	200.	174.63	14239.	49	4909.	8
12.84	250.	205.24	14353.	49	3519.	7
15.36	300.	232.02	14461.	49	1123.	13
19.04	350.	255.50	14564.	49	0.	62
21.21	400.	276.13	14664.	49	0.	62
25.09	450.	294.24	14770.	49	0.	62
29.89 ✓	500.	310.08	14872.	49	0.	62
35.97 ✓	550.	323.88	14971.	49	0.	62
43.82 ✓	600.	335.98	15068.	49	0.	62
54.31 ✓	650.	346.62	15162.	49	0.	62
68.85 ✓	700.	355.57	15254.	49	0.	62
90.06 ✓	750.	362.63	15345.	49	0.	62
123.15 ✓	800.	368.59	15437.	49	0.	62
180.55 ✓	850.	373.62	15526.	49	0.	62
298.60 ✓	900.	376.18	15617.	49	0.	62
641.71	950.	379.69	15701.	49	782.	24

PROB 5 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 060 HAMMER

WIIP=0.10, UNIFORM WALL THICKNESS=1.0 IN. NU = 35

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 35.00

BLOWS PER FOOT	RESISTANCE TONS
145.78	823.
180.55	850.
237.83	879.
298.40	✓900.

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WAVE EQUATION ANALYSIS FOR 33-IN. DIAMETER PIPE PILES
MC CLELLAND SOIL REPORT DATA FOR ACMR 3-PILE STRUCTURES -- U.S.NAVY
25 AUGUST 1976

PROB
  6      33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
         150FT PENETRATION -- VULCAN 040 HAMMER
         WTIP=.50, UNIFORM WALL THICKNESS=1.0 IN.     RU = 50

TABLE 1 -- PROGRAM CONTROL DATA

     PILE TYPE                               1
     NEW HAMMER DATA OPTION                  1
     NEW MATERIAL DATA OPTION                1
     NEW PILE SECTION DATA OPTION            1
     NEW SOIL DATA OPTION                    1
     SPECIFIED BLOW COUNT OPTION             1
     OUTPUT OPTION FOR STRESS                1
     BPF FOR STRESS OUTPUT OPTION                          275.
     ULTIMATE RESISTANCE INCREMENT (TONS)                  50.0
     MAX BLOWS FOR RESISTANCE-BLOW CURVE (BPF)             300.
     SPECIFIED SEGMENT LENGTH (FT)                         -0.00

TABLE 2 -- HAMMER DATA

     HAMMER DESCRIPTION              VULCAN 040 HAMMER
     HAMMER EFFICIENCY                      .75
     HAMMER ENERGY (FT-LBS)           120000.00
     HAMMER EXPLOSIVE FORCE (LBS)         -0.00
     NUMBER OF HAMMER SEGMENTS                2

     SEGMENT     SLACK      WEIGHT      AREA    COEF OF     SPRING CONSTANT
      NUMBER     (IN)        (LB)     (SQ IN) RESTITUTION    (LB / IN)

        1       1000.00  40000.00      1.00       .60       2760000.00
        2       1000.00  27800.00      1.00       .90             0.00

TABLE 3 -- MATERIAL DATA

     NUMBER OF MATERIAL TYPES =     1

         MATERIAL       (TOD)   UNIT WT.    MODULUS
           TYPE                  (PCF)       (PSI)

             1          33.000     490.0 29000000.

TABLE 4 -- PILE SECTION DATA

     TOTAL NUMBER OF PILE SECTIONS          9
```

NUMBER OF SECTIONS IN PILE 0
LENGTH OF FREE STANDING PILE(FT) - 360.00

SECTION NUMBER	MATERIAL TYPE	WALL THICKNESS (IN)	LENGTH (FT)	STATION NUMBER TOP	STATION NUMBER BOTTOM
1	1	1.000	30.	0	30
2	1	1.000	50.	30	80
3	1	1.000	50.	80	130
4	1	1.000	50.	130	180
5	1	1.000	60.	180	240
6	1	1.000	60.	240	300
7	1	1.000	60.	300	360
8	1	1.000	75.	360	435
9	1	1.000	75.	435	510

TABLE 5 -- SOIL DATA

NUMBER OF TIP RESISTANCE PERCENTAGES 1
SIDE DAMPENING RESISTANCE = JSIDE .15
POINT DAMPENING RESISTANCE = JPOINT .15
SOIL QUAKE FOR SIDE = QSIDE .10
SOIL QUAKE FOR POINT = QPOINT .30

TIP RESISTANCE PERCENTAGE
50.0000

TABLE 6 -- SPECIFIED BLOW COUNT DATA

NUMBER OF SPECIFIED BLOW COUNTS 4

BLOWS PER FOOT	TOLERANCE
150.	25.
200.	25.
250.	25.
300.	25.

PHOB 6 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30, UNIFORM WALL THICKNESS=1.0 IN. NU = 50

TABLE 7 -- PILE SEGMENT DATA

SEGMENT	ELEV FT	SLACK IN.	WEIGHT LBS	AREA SQ.IN.	COEF RSTITU	SPR STIFF LBS/IN.
1	0.00	1000.00	40000.00	1.00	.60	2780000.
2	0.00	1000.00	27800.00	1.00	.90	24295040.
3	360.00	0.00	3420.65	100.53	1.00	24295040.
4	350.00	0.00	3420.65	100.53	1.00	24295040.
5	340.00	0.00	3420.65	100.53	1.00	24295040.
6	330.00	0.00	2850.71	100.53	1.00	29154048.
7	321.67	0.00	2850.71	100.53	1.00	29154048.
8	313.33	0.00	2850.71	100.53	1.00	29154048.
9	305.00	0.00	2850.71	100.53	1.00	29154048.
10	296.67	0.00	2850.71	100.53	1.00	29154048.
11	288.33	0.00	2850.71	100.53	1.00	29154048.
12	280.00	0.00	2850.71	100.53	1.00	29154048.
13	271.67	0.00	2850.71	100.53	1.00	29154048.
14	263.33	0.00	2850.71	100.53	1.00	29154048.
15	255.00	0.00	2850.71	100.53	1.00	29154048.
16	246.67	0.00	2850.71	100.53	1.00	29154048.
17	238.33	0.00	2850.71	100.53	1.00	29154048.
18	230.00	0.00	2850.71	100.53	1.00	29154048.
19	221.67	0.00	2850.71	100.53	1.00	29154048.
20	213.33	0.00	2850.71	100.53	1.00	29154048.
21	205.00	0.00	2850.71	100.53	1.00	29154048.
22	196.67	0.00	2850.71	100.53	1.00	29154048.
23	188.33	0.00	2850.71	100.53	1.00	29154048.
24	180.00	0.00	2932.16	100.53	1.00	28344213.
25	171.43	0.00	2932.16	100.53	1.00	28344213.
26	162.86	0.00	2932.16	100.53	1.00	28344213.
27	154.29	0.00	2932.16	100.53	1.00	28344213.
28	145.71	0.00	2932.16	100.53	1.00	28344213.
29	137.14	0.00	2932.16	100.53	1.00	28344213.
30	128.57	0.00	2932.16	100.53	1.00	28344213.
31	120.00	0.00	2932.16	100.53	1.00	28344213.
32	111.43	0.00	2932.16	100.53	1.00	28344213.
33	102.86	0.00	2932.16	100.53	1.00	28344213.
34	94.29	0.00	2932.16	100.53	1.00	28344213.
35	85.71	0.00	2932.16	100.53	1.00	28344213.
36	77.14	0.00	2932.16	100.53	1.00	28344213.
37	68.57	0.00	2932.16	100.53	1.00	28344213.
38	60.00	0.00	2932.16	100.53	1.00	28344213.
39	51.43	0.00	2932.16	100.53	1.00	28344213.
40	42.86	0.00	2932.16	100.53	1.00	28344213.
41	34.29	0.00	2932.16	100.53	1.00	28344213.
42	25.71	0.00	2932.16	100.53	1.00	28344213.
43	17.14	0.00	2932.16	100.53	1.00	28344213.
44	8.57	0.00	2932.16	100.53	1.00	28344213.
45	-.00	0.00	2850.71	100.53	1.00	29154048.
46	-8.33	0.00	2850.71	100.53	1.00	29154048.

48	-25.00	0.00	2850.71	100.53	1.00	29154048.
49	-33.33	0.00	2850.71	100.53	1.00	29154048.
50	-41.67	0.00	2850.71	100.53	1[illegible]	29154048.
1	-50.00	0.00	2850.71	100.53	1.	29154048.
52	-58.33	0.00	2850.71	100.53	1.00	29154048.
53	-66.67	0.00	2850.71	100.53	1.00	29154048.
54	-75.00	0.00	2850.71	100.53	1.00	29154048.
55	-83.33	0.00	2850.71	100.53	1.00	29154048.
56	-91.67	0.00	2850.71	100.53	1.00	29154048.
57	-100.00	0.00	2850.71	100.53	1.00	29154048.
58	-108.33	0.00	2850.71	100.53	1.00	29154048.
59	-116.67	0.00	2850.71	100.53	1.00	29154048.
60	-125.00	0.00	2850.71	100.53	1.00	29154048.
61	-133.33	0.00	2850.71	100.53	1.00	29154048.
62	-141.67	1000.00	2850.71	100.53	1.00	29154048.

PROB 6 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30, UNIFORM WALL THICKNESS=1.0 IN. RU = 50

TABLE 8 -- MAXIMUM STRESS DATA

TIP RESISTANCE PERCENTAGE = 50.00

PERMANENT SET OF PILE = .0308 INCHES
NUMBER OF BLOWS PER FOOT = 390.09
TOTAL INTERVALS = 255

SEG	ELEV FT	MAX C STRESS LBS/SQ.IN.	TIME N	MAX T STRESS LBS/SQ.IN.	TIME N	AREA SQ.IN.	DMAX(M) IN.	D(M) IN.	V(M) FT/SEC
1	0.00	1728012.	28	0.	69	1.000	1.788511	1.778261	-.55
2	0.00	1252290.	39	0.	0	1.000	1.385596	1.304944	-1.64
3	360.00	12597.	41	0.	0	100.531	1.366851	1.277479	-1.63
4	350.00	12632.	43	0.	0	100.531	1.357818	1.258986	-1.63
5	340.00	12693.	46	0.	0	100.531	1.348848	1.239690	-1.68
6	330.00	12721.	48	0.	0	100.531	1.340086	1.219406	-1.76
7	321.67	12748.	50	0.	0	100.531	1.333085	1.201711	-1.84
8	313.33	12776.	52	0.	0	100.531	1.326372	1.183249	-1.90
9	305.00	12804.	54	0.	0	100.531	1.319985	1.164189	-1.92
10	296.67	12832.	56	0.	0	100.531	1.313928	1.144810	-1.91
11	288.33	12860.	58	0.	0	100.531	1.308181	1.125376	-1.87
12	280.00	12889.	60	0.	0	100.531	1.302654	1.105991	-1.84
13	271.67	12917.	62	0.	0	100.531	1.297187	1.086542	-1.85
14	263.33	12946.	64	0.	0	100.531	1.291634	1.066770	-1.91
15	255.00	12976.	66	0.	0	100.531	1.285825	1.046447	-1.99
16	246.67	13008.	68	0.	0	100.531	1.279649	1.025534	-2.05
17	238.33	13037.	70	0.	0	100.531	1.272994	1.004208	-2.06
18	230.00	13066.	72	0.	0	100.531	1.265754	.982744	-2.04
19	221.67	13095.	74	0.	0	100.531	1.257817	.961378	-1.99
20	213.33	13123.	76	0.	0	100.531	1.249152	.940258	-1.92
21	205.00	13151.	78	0.	0	100.531	1.239619	.919514	-1.83
22	196.67	13178.	80	0.	0	100.531	1.229205	.899335	-1.71
23	188.33	13204.	82	0.	0	100.531	1.217835	.879895	-1.58
24	180.00	13233.	84	0.	0	100.531	1.205457	.861160	-1.49
25	171.43	13265.	86	0.	0	100.531	1.191700	.842390	-1.42
26	162.86	13291.	88	0.	0	100.531	1.176889	.824034	-1.33
27	154.29	13320.	90	0.	0	100.531	1.161124	.806368	-1.19
28	145.71	13348.	92	0.	0	100.531	1.144467	.789609	-1.06
29	137.14	13375.	94	0.	0	100.531	1.127117	.773640	-.95
30	128.57	13402.	96	0.	0	100.531	1.109436	.758348	-.85
31	120.00	13429.	98	0.	0	100.531	1.091948	.743769	-.75
32	111.43	13457.	101	0.	0	100.531	1.075258	.729798	-.68
33	102.86	13486.	103	0.	0	100.531	1.059703	.716324	-.62
34	94.29	13516.	105	0.	0	100.531	1.045100	.703331	-.57
35	85.71	13544.	107	0.	0	100.531	1.030645	.690701	-.53
36	77.14	13571.	109	0.	0	100.531	1.016421	.678373	-.50
37	68.57	13598.	111	0.	0	100.531	1.001455	.666303	-.49
38	60.00	13626.	113	0.	0	100.531	.985611	.654329	-.48

40	42.35	13704.	117	0.	0	100.531	.950494	.630635	-.49
41	34.2[illegible]	13774.	119	0.	0	100.531	.930937	.618775	-.50
42	25.[illegible]	13887.	122	0.	0	10[illegible]1	.909871	.606903	-.52
43	17.1[illegible]	14049.	124	0.	0	100.[illegible]1	.887102	.594878	-.54
44	8.57	14255.	126	0.	0	100.531	.862729	.582730	-.54
45	-.00	14495.	128	0.	0	100.531	.836743	.570453	-.56
46	-8.33	14727.	131	0.	0	100.531	.810059	.558330	-.56
47	-16.67	14899.	133	0.	0	100.531	.782251	.545948	-.57
48	-25.00	15008.	135	0.	0	100.531	.753951	.533053	-.56
49	-33.33	15053.	137	0.	0	100.531	.725247	.519478	-.55
50	-41.67	15034.	139	0.	0	100.531	.695798	.505004	-.53
51	-50.00	14947.	141	0.	0	100.531	.665193	.489488	-.51
52	-58.33	14774.	143	0.	0	100.531	.633610	.472936	-.48
53	-66.67	14459.	145	0.	0	100.531	.602013	.455360	-.45
54	-75.00	13968.	146	0.	0	100.531	.571526	.436815	-.42
55	-83.33	13376.	149	0.	0	100.531	.541396	.417368	-.39
56	-91.67	13019.	153	0.	0	100.531	.510688	.397158	-.35
57	-100.00	12655.	154	0.	0	100.531	.479848	.376302	-.31
58	-108.33	11981.	155	0.	0	100.531	.448745	.354955	-.27
59	-116.67	11079.	158	0.	0	100.531	.417354	.333341	-.23
60	-125.00	10673.	161	0.	0	100.531	.386709	.311728	-.19
61	-133.33	10287.	164	0.	0	100.531	.357954	.290354	-.15
62	-141.67	9807.	166	0.	0	100.531	.330762	.269477	-.11

PROB 6 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES

150FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30, UNIFORM WALL THICKNESS=1.0 IN. RU = 50

TABLE V -- RESISTANCE-BLOW CURVE DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS/FT.	RESISTANCE TOTAL-TONS	DYNAMIC PT FORCE-TONS	MAX C STRESS LBS/SQ.IN.	SEG NO.	MAX T STRESS LBS/SQ.IN.	SEG NO.
1.89	50.	75.94	13035.	51	9775.	10
3.73	100.	141.50	13949.	49	8255.	9
5.89	150.	198.40	14075.	49	6504.	9
9.30	200.	247.89	14172.	50	4558.	8
14.79	250.	291.02	14261.	50	3130.	8
18.41	300.	328.78	14346.	50	899.	13
22.42	350.	361.60	14428.	49	0.	62
27.53	400.	390.16	14509.	49	0.	62
34.24	450.	415.49	14587.	49	0.	62
43.44	500.	437.76	14664.	49	0.	62
56.59	550.	456.39	14744.	49	0.	62
76.76	600.	474.03	14824.	49	0.	62
111.17	650.	488.70	14902.	49	0.	62
181.29	700.	498.73	14978.	49	0.	62
390.09	750.	492.95	15053.	49	0.	62

240 : 722 > 300 : $\underline{\underline{735}}$

~~390 : 750~~

PROB 6 33-IN. DIAMETER PILES MLW=105FT 3-PILE STRUCTURES
150FT PENETRATION -- VULCAN 040 HAMMER

WTIP=.30, UNIFORM WALL THICKNESS=1.0 IN. NU = 50

TABLE 10 -- SPECIFIED BLOW DATA

TIP RESISTANCE PERCENTAGE = 50.00

BLOWS PER FOOT	RESISTANCE TONS
142.78	678.
181.29	700.
240.35	722.
298.60	900.

PUYIEYS,   08/25/76, *UNITED COMPUTING* 67, APEX/SL 8.7.0

```
15.45.05$PIL,CM100,T1000.
15.45.05$FL      64     0.000
15.45.06$ACS400C880031,2777101CC )B
15.45.06. 08/25/76,PUYIEYS
15.45.06.RFL,40000.
15.45.06$FL    3392     0.000
15.45.06$FL   16384     0.000
15.45.06.MAP,OFF.
15.45.06$FL     256     0.000
15.45.06.GET,PILB(C880020)
15.45.09.READY =    PILB
15.45.09$FL    4096     0.001        0         0.
15.45.09$FI      72         1
15.45.09.PILB.
15.45.09$FLS  16384     0.002
15.45.10$FLR  16384     0.145      190         5
15.45.10.FL REQUIRED TO LOAD      36340B ( 15584)
15.45.10.FL REQUIRED TO EXECUTE   34000B ( 14336)
15.45.10$FL   16384     0.149
15.47.02.END PILORI
15.47.02.COST.
15.47.02$FL   14336    89.644      208        13
15.47.03.            SERVICE UNITS=     226.4
15.47.03.           JOB COST=$      56.58
15.47.03$FL   12288    89.660        7         5
15.47.03.EXIT.
15.47.03$JTCO  2368    89.660
15.47.03.     *FL*  *CPU SEC. *DISC PHUS* DISC ACC
15.47.03.*P.F. PHUS*P.F. ACC *TAPE PHUS* TAPE ACC
```

END

FILMED

3-86

DTIC